ENGINEERING NEWS-RECORD

AUG. 15, 1957

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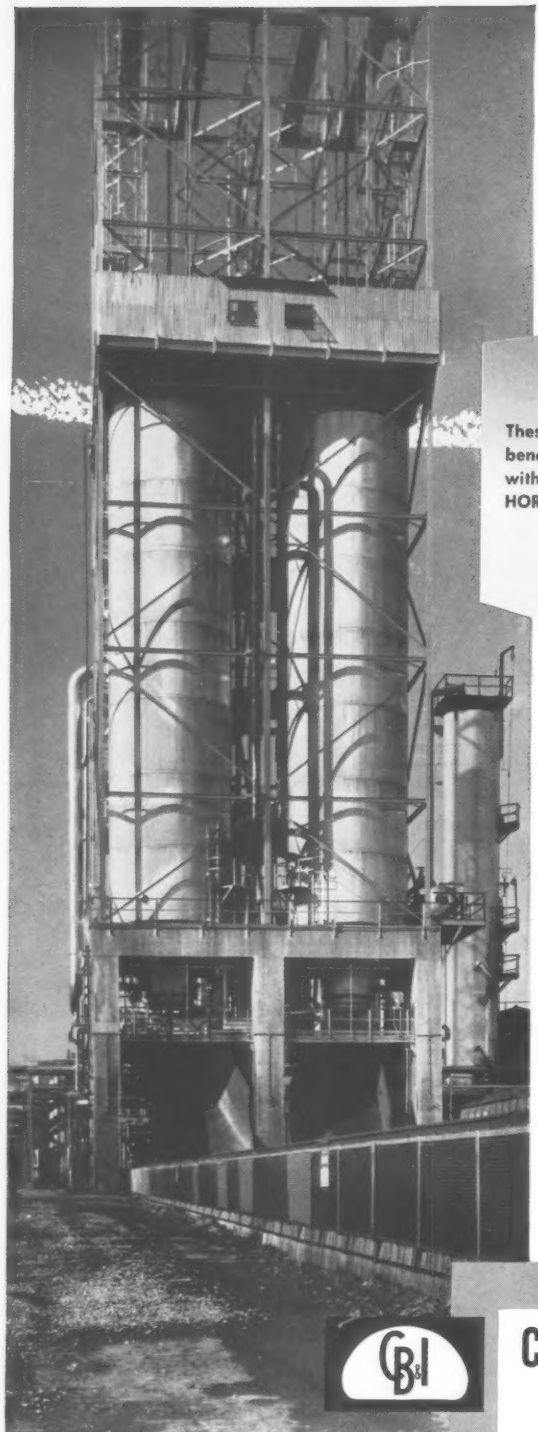

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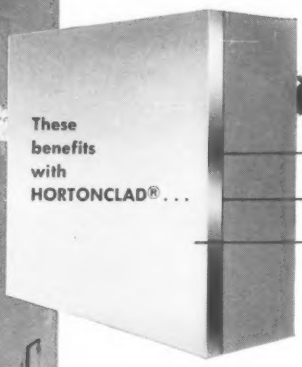
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P52

Going up on Fifth Avenue

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The 470-ft framework required somewhat over 13,000 tons of structural steel. Our crews used high-strength bolts during steel erection, making the building one of the tallest ever to be bolted. They topped out the steel late in April, shortly after the picture was taken.

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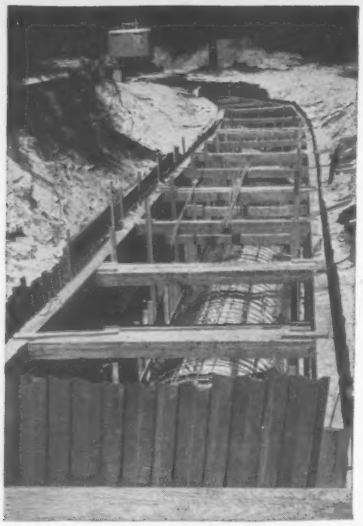

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ENGINEERING NEWS-RECORD, Vol. 159, No. 7, AUGUST 15, 1957

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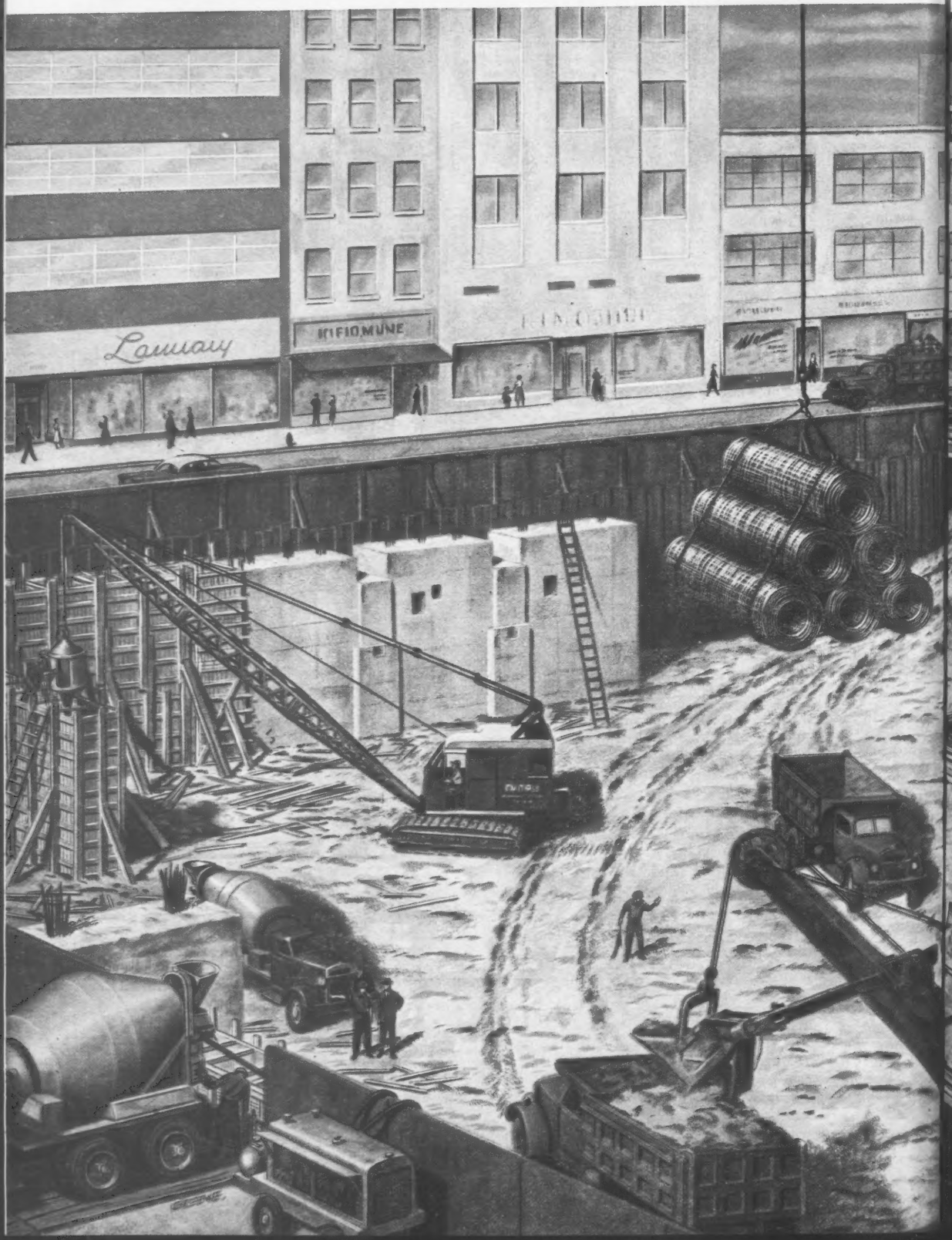

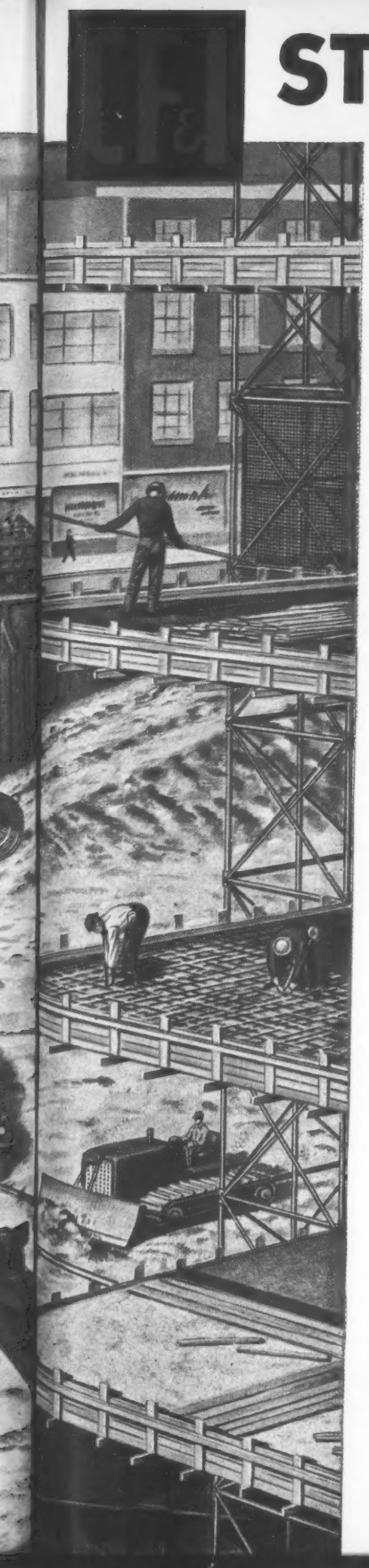

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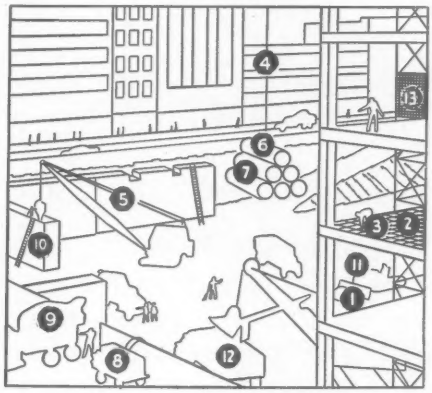

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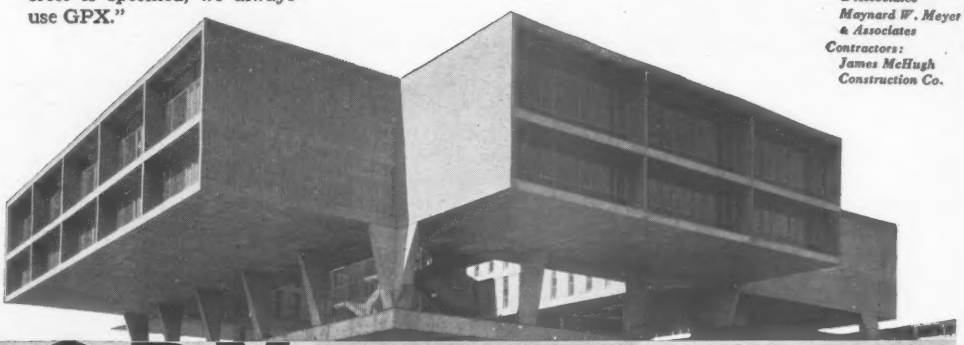

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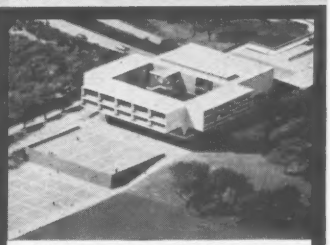

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Some Answers to Anchor-Bolt Problems

In ENR May 30, p. 10, a letter from H. K. Lee appeared outlining the problems encountered with the type of anchor bolts now commonly used. Mr. Lee evidently touched on a matter of much concern to our readers, judging from the correspondence generated.

His letter outlining the shortcomings of conventional anchor-bolt designs is reprinted below.

Replies illustrating designs that eliminate some or all of the objections Mr. Lee raised follow.

SIR—The engineering profession should be continuously probing and investigating existing design and construction practices to establish safer and more economical design and construction. But is it so?

Recently, I saw a big group of men placing concrete and setting up thousands and thousands of anchor bolts for a giant industrial plant near Indianapolis. The bolts projected 3 to 6 in. above the concrete floor. Material-handling men complained bitterly about the obstructions and interferences of these bolt projections and the erection crew cursed loudly about anchor bolts that were off line. The crew had to bend them by hammering or even burning them with torches to fit them into the bolt holes.

Present-day anchor bolts are rather primitive and crude in design. They are merely made of steel rods hooked at one end and threaded at the other. The designer specifies only the size and length. In the field, it is hard to place the bolts in fixed locations while placing concrete. Yet, fundamentally, the true function of an anchor bolt is its ability to hold to the desired position.

The projections of these embedded anchor bolts above the floor presents serious obstructions to correct shifting and moving of heavy columns or machines along the floor preparatory to their being anchored in place. Also, the work required to raise heavy columns and machines above bolt projections for centering and fitting into bolt holes entails extra labor and cost.

The construction industry needs an efficient anchoring or fastening method that can meet the following requirements: (1) Easy, quick installation, even by unskilled workers; fool-proof; and non-shifting. (2) No bolt projection above the floor. (3) No obstruction to construction of a perfectly smooth, flush and durable surface to receive column and machine bases, thus eliminating grouting under the bases after columns and machines are installed. (4) Full development of the structural strength of the bolts or fasteners, according to engineering requirements. (5) Flexibility for easy adjustment in all directions, thus eliminating them with torches to fit them into the bolt holes.

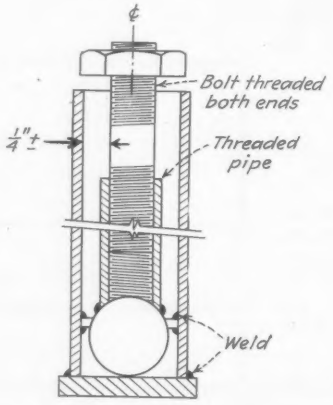
The only effort made so far is to provide some sort of flexibility in setting the bolt inside a pipe sleeve. This method merely gives more length and space for bending the projections of the embedded bolts to fit into bolt holes; but still they have to be bent by hand to get the desired fitting.

Is this anchor bolt problem too simple to be neglected? Or is it a worthy challenge to engineers to create a new, revolutionary anchoring or fastening method?

H. K. LEE
4838 *Underwood St.*
Detroit 4, Michigan

•

SIR—I submit a design I feel would be a universal anchor-bolt system. This system should have certain advantages over previous anchor-bolt designs.



The length of the outer case can be made up to any length desired. Inside diameter of the outer case can be made from any standard pipe size. The threaded inside case for the anchor bolt could be manufactured in quantity and in standard lengths. Length of the anchor bolt could be cut to any needed size and, in fact, any standard threaded bolt could be employed.

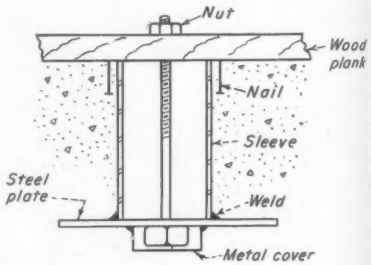
The ball-joint socket assures a slight rotation of the anchor bolt so that in case of minor discrepancies of centering, the bolt could be canted to one side for a probable maximum displacement of ¼ in.

I hope this design is an approach to a better and more satisfactory anchor bolt.

EDWARD T. DWYER
General Builders, Inc.
Trenton, N. J.

•

SIR—The question of movement of anchor bolts is simply solved by the installation as shown below.



The sleeve is welded to the plate but the bottom of the bolt is free. The top of the bolt is held in timber with three nails holding the sleeve in position. The top nut is attached to the timber holding the nut in the correct position in the form. Thus the whole assembly is rigid during the placing of concrete.

As soon as the concrete is partially set, the timber is removed and the whole bolt rotated by hand with a circular motion, thus loosening the bottom of the bolt. In another way the bottom of the bolt can be encased in a sheet metal cover tacked to the plate, thus leaving it free to be moved laterally in the sleeve.

A further precaution well worth while is to fill the sleeve immediately

Engineering News-Record welcomes expression of opinion from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance.

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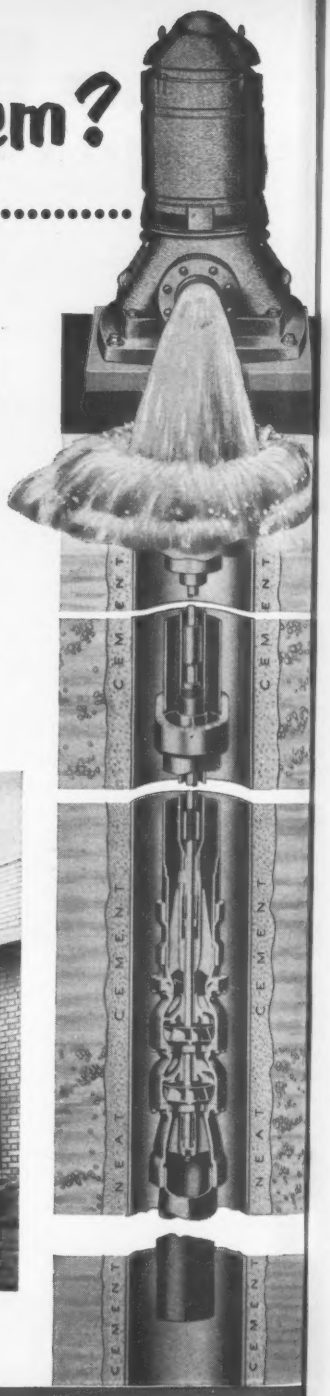

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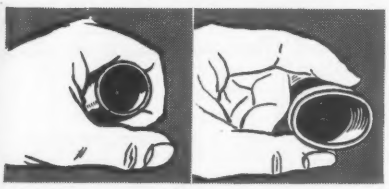
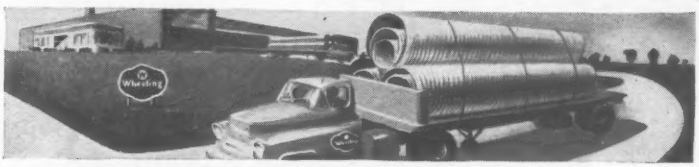


SIMPLE TEST OF FLEXIBILITY. *Squeeze a piece of garden hose with the entire hand. It "gives" uniformly around its circumference. (Flexible Pipe.) Now place it between the thumb and forefinger. Notice how easily it "gives" at both top and bottom. (Rigid Pipe.)*



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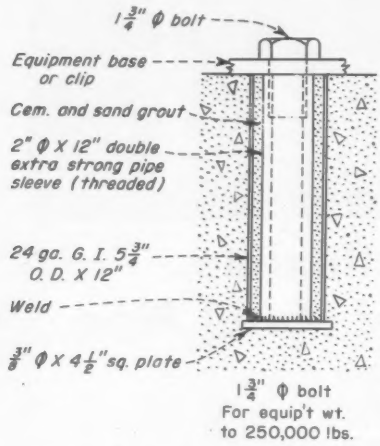
under the timber holding the top nut with paper to eliminate the possibility of concrete falling in the sleeve during pouring operation.

It is my experience that grouting up of machine bases is an advantage as it allows accuracy and is cheaper than taking great care with foundations when poured initially.

C. G. DANIELS
Ewbank & Partners (Canada) Ltd.,
Toronto, Ontario

•

SIR—Enclosed is a sketch showing a solution to the anchor bolt problem as presented by Mr. H. K. Lee.

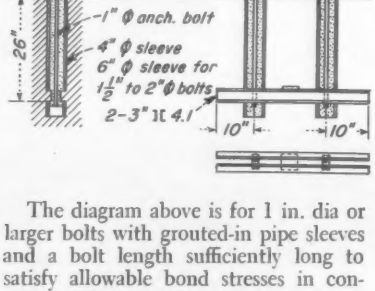

1¾" ϕ bolt
Equipment base or clip
Cem. and sand grout
2" ϕ X 12" double extra strong pipe sleeve (threaded)
24 ga. G. I. 5¾" O. D. X 12"
Weld
⅜" ϕ X 4½" sq. plate
1¾" ϕ bolt
For equip't wt. to 250,000 lbs.

Other size bolts down to ¾ in. dia can be used for equipments weights to 34,000 lb.

DONALD L. PRAY
Design Engineer
San Diego Gas & Electric Co.
San Diego, Calif.

•

SIR—To avoid anchor bolt projection above floor elevations, during construction and erection periods, a removable type is suggested.



The diagram above is for 1 in. dia or larger bolts with grouted-in pipe sleeves and a bolt length sufficiently long to satisfy allowable bond stresses in concrete. The horizontal anchor beam with grouted-in anchor bolts is designed for erection loads only and the total pull on the bolts is transferred by bond to the concrete footing after grouting.

If the grouting-in of anchor bolts after erection of equipment is difficult and has to be avoided, then the horizontal anchor beam is stressed in bending with a uniform load equal to the anchor bolt pull.

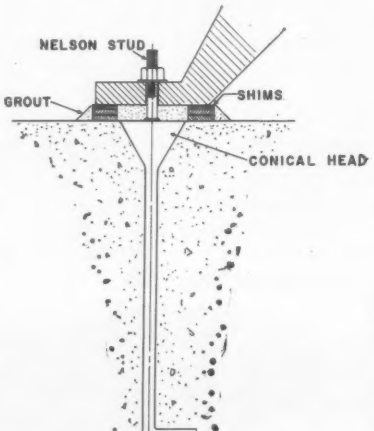
H. KLOSS
Giffels & Vallet, Inc.
Detroit, Mich.

•

SIR—To anyone who has had experience with the placing of anchor bolts the problems described in Mr. Lee's letter are very real indeed. I would like to offer a possible solution.

It is not economically feasible to set bearing plates in the floor surface at the exact elevation required. In order to set bearing plates and anchors so that they will remain fixed during pouring, a very strong and stiff holding apparatus is required which means expense in material and labor. Floor surfaces may be levelled fairly accurately but again more time is involved to do so. Furthermore, the machine bases themselves may not be plane surfaces and consequently all this work would be in vain. Therefore grouting is almost an economical necessity.

The problem of bolt projection may be easily eliminated by using a conical head anchor bolt together with "Nelson Studs" as shown below. The conical heads of the anchor bolts would enable the bolts to be placed with a reasonable amount of tolerance and would be economical if mass produced. However, part of a standard rolled section or cylinder could be substituted for the mass produced conical head.



The sequence of installation would be to; place the Anchor bolts, pour and allow the concrete to cure, and then, set the machines on blocks over the anchor bolts in the correct horizontal position.

Level the machines by means of shims and Nelson Studs installed or Nelson Studs installed first with a nut under the machine bases and machine levelled by means of these nuts. The latter solution would only be possible with light machines.

Finally, place expanding grout under bases.

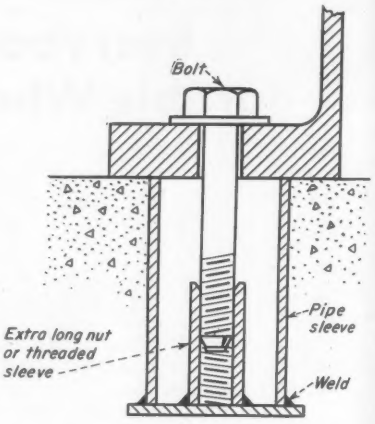
This solution may be applied to structure bases as well but with column bases the other plate may be necessary for convenience so that adjustments can be made to the plate instead of to the whole column.

H. M. MCCOLLISTER
Haddin, Davis & Brown, Ltd.
Calgary, Canada

•

SIR—Here is an answer to Mr. Lee's letter on flush top anchor bolts.

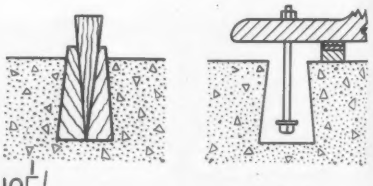
THOMAS HYNES
Long Island City, N. Y.



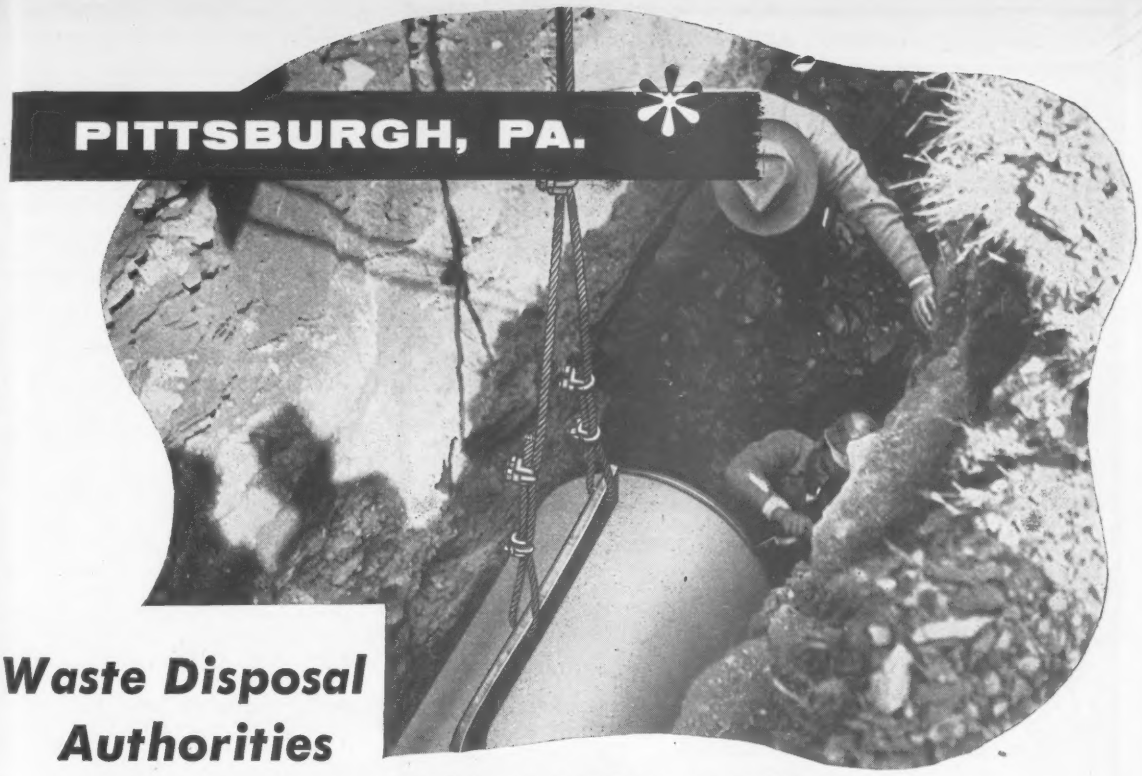
•

SIR—The question about anchor bolts raised by H. K. Lee is a very good one.

In current French practice, anchor bolts are not embedded in advance. Instead, a square hole of 4 in. x 4 in. to 10 in. x 10 in. is provided by three pieces of greased wood forming a dovetailed hole in the slab or foundation.



The wood is left in place until the bolt is needed. The wood is sawed



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Not only did they get water-tight joints throughout the line, but the TYLOX Gaskets "paid off" in yet another important aspect — reduced construction cost. . . . With TYLOX, workmen were able to couple pipe rapidly in spite of flooded trenches, and to eliminate "waiting time" by backfilling laid line immediately.

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CONTRACTORS: Nicassio Construction Company, Pittsburgh, Penna.

PIPE: Reinforced concrete pipe with TYLOX Rubber Joints, furnished by Neville Concrete Products Co., Neville Island, Pittsburgh, Penna.

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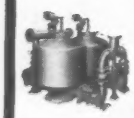

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nearly flush with concrete. If the projection is to be eliminated, the wood is removed, cut to size and the wedge re-greased and replaced. The greasing helps to remove the wedge when the projecting part is sawed off.

During installation of equipment the bolts are inserted in the base plate, the equipment is then shimmed and grouted and the bolt tightened when the concrete is set.

B. Pross
Hopewell, Va.

•

Sir—H. K. Lee's anchor bolt problems plagued many a construction superintendent, with repercussions on the design engineers. Mr. Lee's sketches illustrate two of the most popular anchor bolt designs in general use. They also present examples of the two major objections—inflexible setting in the horizontal plane and surface obstruction.

If accurate templets are required of all equipment manufacturers and structural steel fabricators, and the embedded bolts are carefully set to templets and restrained against subsequent displacement, true positioning is distinctly possible and practical. Then, instead of Mr. Lee's sleeve design with the bolt head welded to the anchor plate, I suggest a heavy nut be welded to the underside of an anchor plate punched to bolt size, and a blind or capped sleeve of length sufficient to run down the bolt plus say $\frac{1}{4}$ to $\frac{1}{2}$ in. The bolt can then be applied at any time.

Where great precision is vital and unit cost is secondary, the cast steel adjustable anchor manufactured by Adjustable Anchor Corp, Richland, Wash., may be used for bolt diameters $\frac{3}{8}$ to $1\frac{1}{8}$ in. inclusive. These permit vertical adjustment to $\frac{5}{8}$ in. in one mil increments, and horizontal adjustments ranging from approximately $\frac{3}{4}$ to $2\frac{3}{8}$ in. They have a claimed pullout resistance in the range of from 8,000 to 12,000 lb., and by welding a tie to the reinforcing steel this factor can be increased.

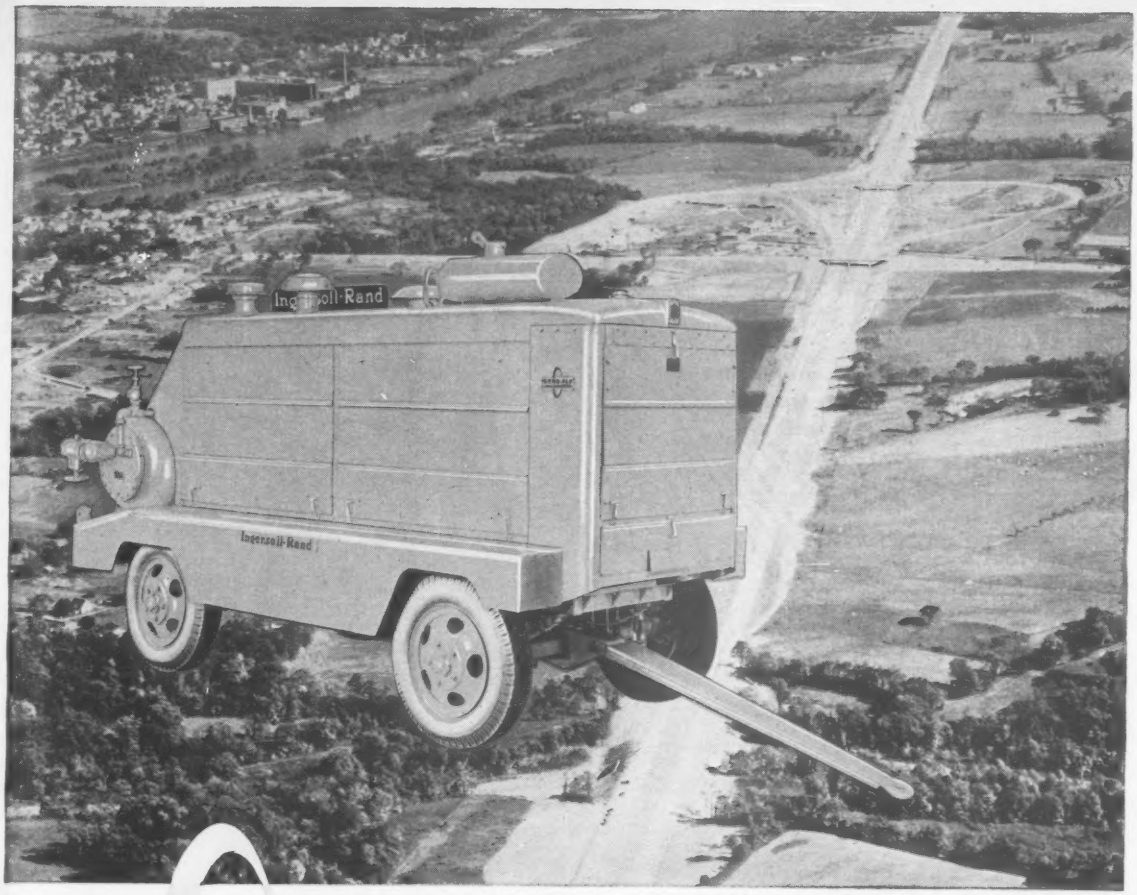
George Clark
Bechtel Corp.
San Francisco, Calif.

•

Sir—Here is a suggested answer for the anchor bolt problem.

For many years bridge engineers have used a cored hole under anchor-bolt holes in shoes or column bases. After the member is set in place, the cored hole is filled to proper depth with a small aggregate concrete. The anchor bolt is then shoved or driven down into the fresh concrete. Be sure there is enough head room for bolt to enter the hole. A swaged bolt should be used.

The form for the cored hole should be removable and the hole surface



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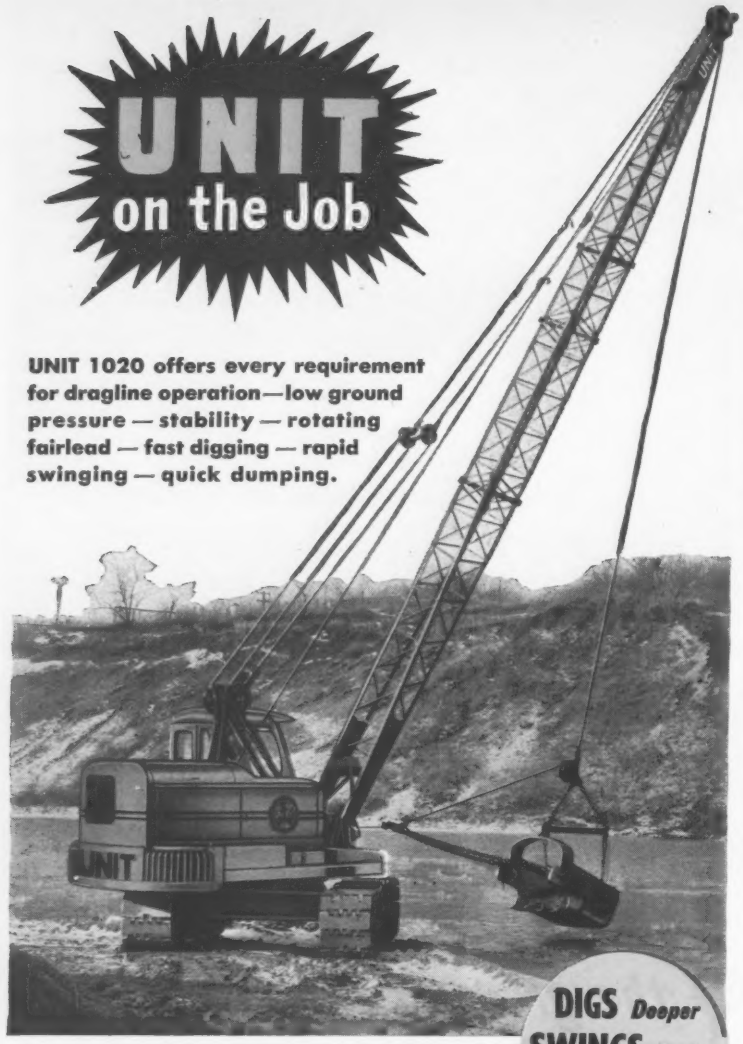

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CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

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. . . Reader Comment

should be irregular for better anchorage.

A 3 in. or 4 in. cored hole would be sufficient for a 1¼ in. dia bolt. Bolt length should be sufficient to develop the required anchorage.

VERNON H. SMITH
Structural Engineer
Memphis, Tenn.

Slip On Designer Credit

SIR—The article, "The World's Tallest Welded Building," which appeared in ENR May 2, p. 44, was very well done, and is correct in all respects except credit for the design. Preston M. Geren was the engineer as well as the architect. I was one of his employees.

DON W. KIRK
Consulting Engineer
Ft. Worth, Texas

Wood Lamellar Dome Roof

SIR—Your article describing the wood lamellar dome roof for the municipal reservoir of Beavertown, Ore. (ENR, July 25, 1957, p. 49) describes a practical and economical means of protecting water supplies from pollution.

One point in question, however, is that the text describes the Douglas fir lumber as "coated with an oil preservative." This may be entirely misleading to your readers because, as a matter of fact, all structural material in the dome was Douglas fir pressure treated, after fabricating, with a 5% pentachlorophenol solution to a minimum retention of 6 lb per cu ft.

Because reservoir roofs of this type are exposed to ideal conditions for the promotion of decay by wood-destroying fungi, a mere coating of the lumber with a wood preservative would provide wholly inadequate protection. Pressure treatment, after fabrication of the individual members, was used to provide deep penetration and thorough distribution of the preservative as a means of insuring long service life.

C. MILES BURPEE
Executive Director
American Wood Preservers Institute
Chicago, Ill.

CALENDAR

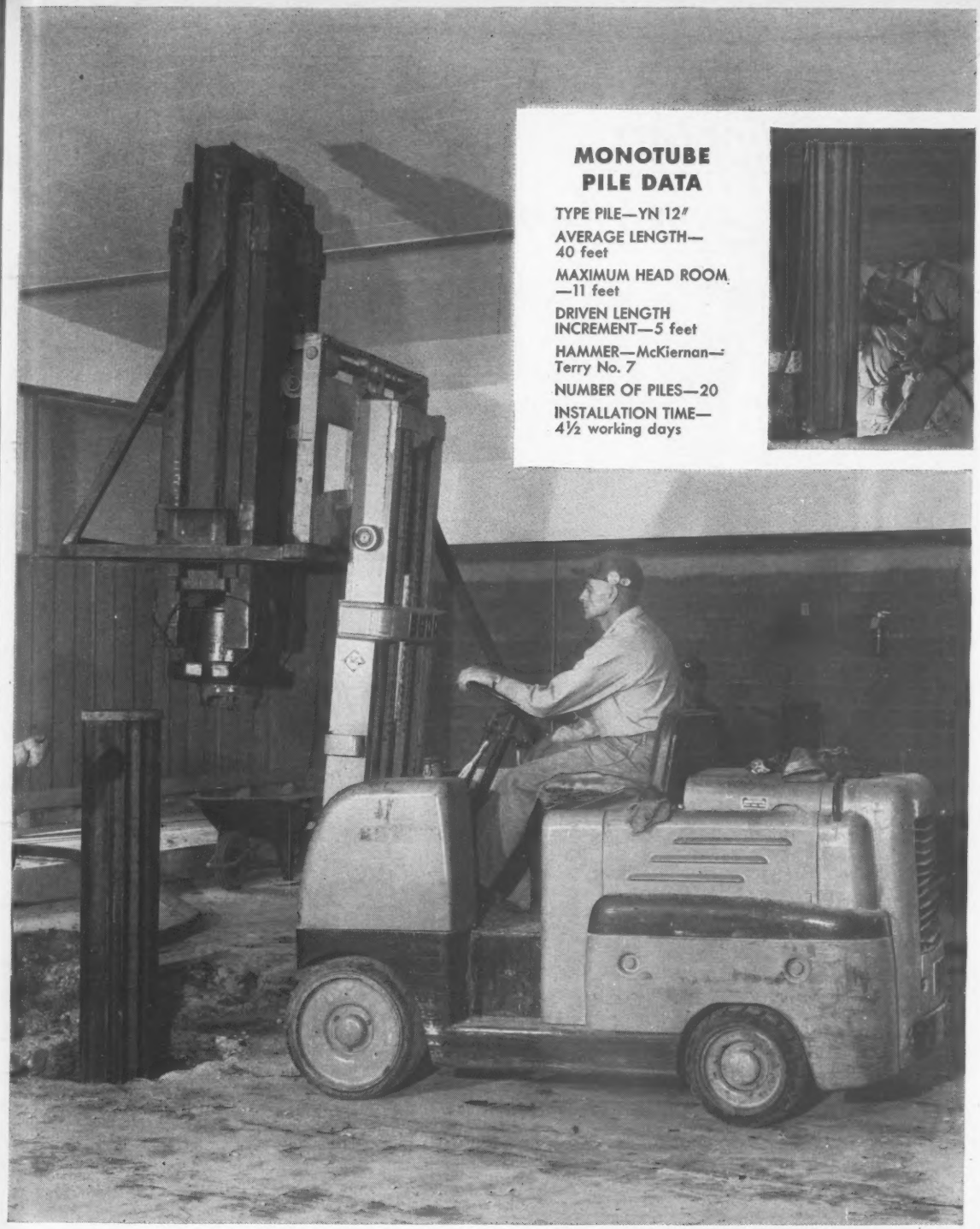
Hydraulics Div., American Society of Civil Engineers, Kresge Auditorium, Massachusetts Institute of Technology, Cambridge, Mass., Aug. 26-28.

International Conference of Building Officials, annual business meeting, St. Francis Hotel, San Francisco, Calif., Sept. 13-15.

Building Research Institute's Plastics Study Group, Washington University, St. Louis, Mo., Sept. 17-18.

Public Works Congress and Equipment Show, American Public Works Association, Grand Exhibition Hall, Philadelphia, Pa., Sept. 22-25.

Federation of Sewage & Industrial Wastes Associations, Hotel Statler, Boston, Mass., Oct. 7-10.



MONOTUBE PILE DATA

TYPE PILE—YN 12″

AVERAGE LENGTH—40 feet

MAXIMUM HEAD ROOM—11 feet

DRIVEN LENGTH INCREMENT—5 feet

HAMMER—McKiernan–Terry No. 7

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ADAPTABILITY plus ECONOMY with Monotube piles . . . ideal for underpinning projects where conditions are difficult, and rapid job completion is important. Monotubes are easily cut to required lengths, easily handled, easily assembled and easily driven despite low head room.

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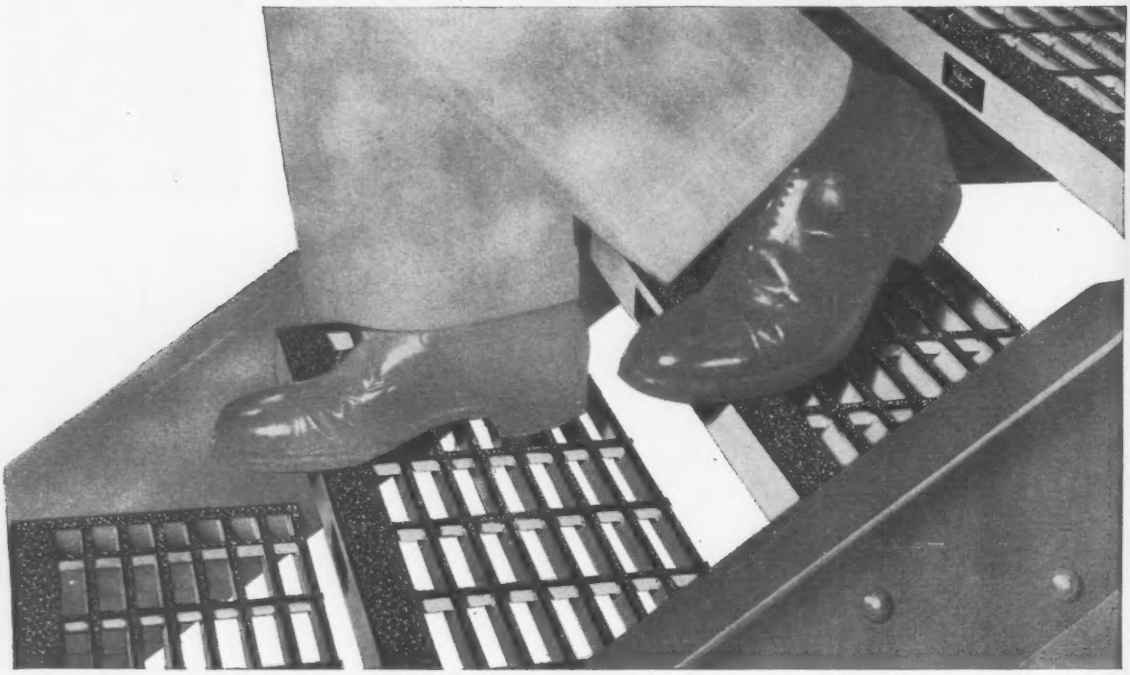

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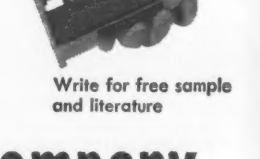

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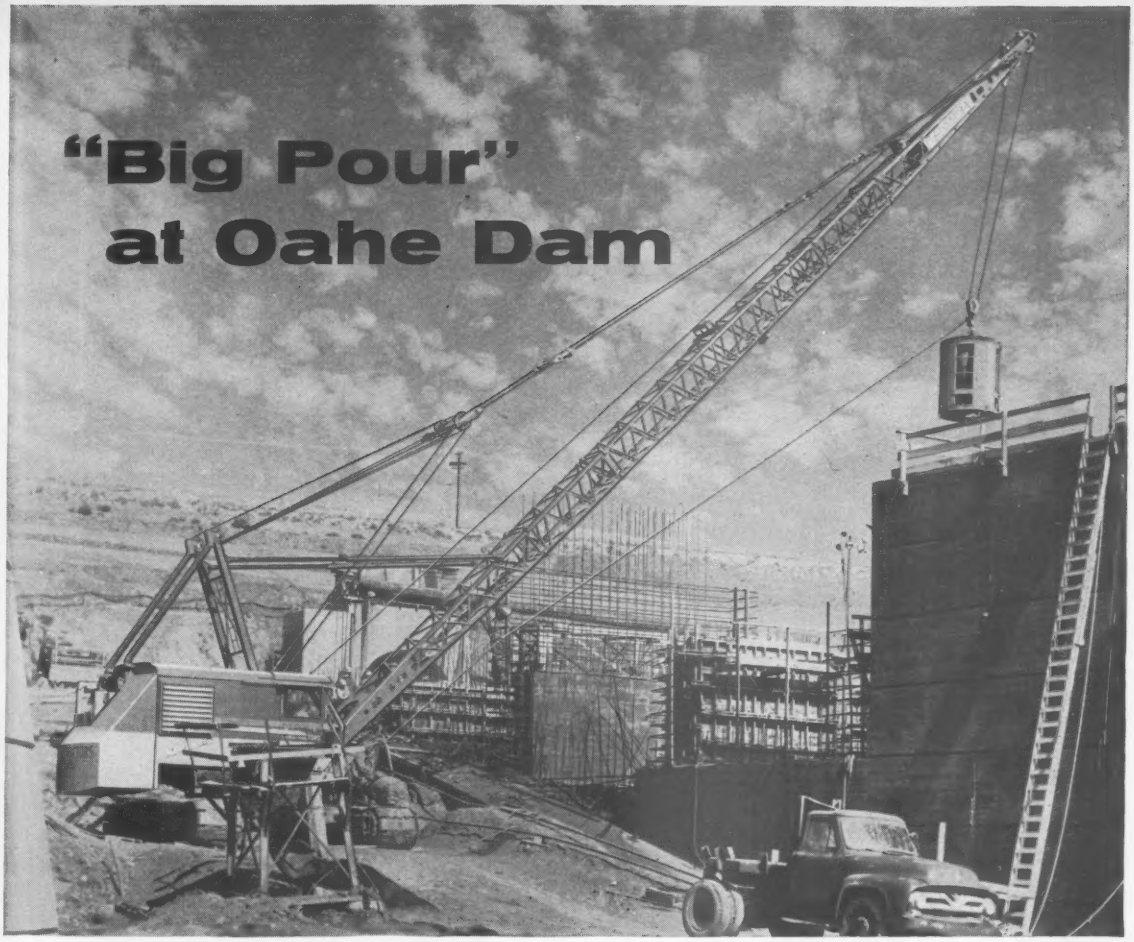

Manitowoc crane handles almost 115,000 yards of concrete

Pierre Constructors rely on a fast Manitowoc Model 3900 60-ton crane to set the pace spot pouring concrete at the $320,000,000 Oahe Dam Project near Pierre, South Dakota. The company's concrete contract calls for 115,000 yards — most of it handled by the Manitowoc rig equipped with a 100′ boom and a 2-yd. bucket.

Precise Control

Easy-to-operate air controls and smooth torque converter power help the crane operator to hit the forms with absolute precision. The 11,600 lb. bucket is brought to within 6″ of the forms easily and quickly because of the exact "feel" of the air controls. Uniform power flow from the torque converter eliminates all "jump" from crane operation when swinging the heavy concrete bucket over the forms.

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In addition to pouring concrete, the Manitowoc 3900 also sets derrick stone. For this exacting operation, the same 100′ boom is used, providing a 45-ton capacity. The crane's wide-spread crawlers and massive carbody, together with balanced design for scientific weight distribution, assure the positive stability necessary for pin-point accuracy.

Performance-Proved

Pierre Constructors also operate a Manitowoc 1¼-yd. Model 2000 Trench Hoe at the dam site. H. B. Bruce, Project Manager for the company says, "Both units have come up to all expectations. We especially like the independent boom hoist on the crane which allows us to lift and at the same time operate in a larger area without shifting the boom or traveling. This not only saves time, but also cuts down on wear and tear on the machine."

You can have outstanding performance like this on *your* next contract. Call your Manitowoc distributor now for full details and informative literature.

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SHOVELS
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CRANES
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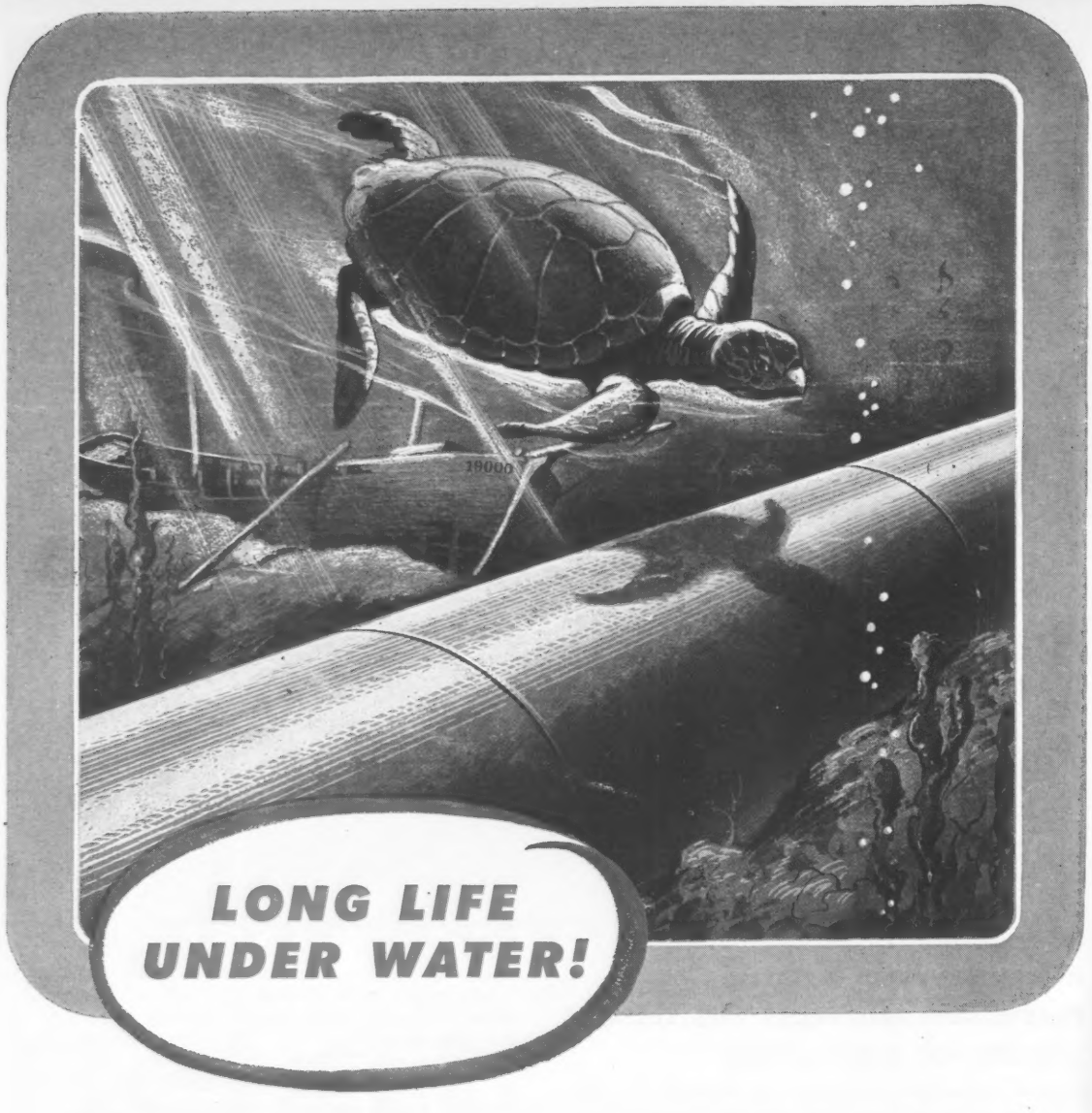

LONG LIFE UNDER WATER!

The giant marine turtle, or "leatherback", is reputed to live for 250 years. This tremendous life span is, in part, attributable to its tough, durable shell—a natural protection against the rigors and constant buffeting of underwater life.

LOCK JOINT REINFORCED CONCRETE SUBAQUEOUS PIPE owes much of its unusual underwater longevity to its "shell"—the dense concrete wall which makes it practically ageless. To assure the strongest possible concrete, periodic compressive tests are taken of each day's run of concrete in every Lock Joint plant. This is only one of the many quality control measures marking every phase of the manufacture of Lock Joint Pipe.

Can you guess how many cubic yards of this high quality concrete were required in the production of the 18,000 ft., 120 inch diameter Lock Joint Reinforced Concrete Subaqueous Pipeline for the intake of Cleveland's water supply system? The answer can be found in the picture above.

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ENGINEERING NEWS-RECORD

Vol. 159, No. 7 August 15, 1957

Number of copies printed this issue: 78,848

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THE CONSTRUCTION WEEK

CONTRACTOR FAILURES DECLINE AGAIN—The number of contractor failures was down in July for the second consecutive month, according to Dun & Bradstreet. The failures dropped to a total of 153 last month from 164 in June—but this July's total is still 9% higher than the same month last year. The total for the first seven month of 1957 is 1,232 or 22% above the same period last year. The most successful category last month was the general building contractor—only 50 failures were reported, only one more than last year. Hardest hit were the building subcontractors.

POLICY DILEMMA—A state highway department policy of honoring union picket lines last week tied up Kentucky's first project under the federal highway program. In a jurisdictional clash between members of the AFL-CIO and John L. Lewis' United Construction Workers, work on the Nolin River bridge in Hardin County was picketed by four AFL-CIO unions: carpenters, laborers, teamsters and operating engineers. Project contractor, Saltzman Construction Co., has a labor agreement with UCW. Under a highway department policy forbidding its personnel to cross picket lines, state inspectors stayed off the project, bringing work to a halt. Saltzman obtained a temporary injunction removing the pickets, and a high-level review of the department policy is under way. Said the acting governor: "We are going to see that the roads are built . . . . We can't allow picketing to keep our people off the job."

CONCRETE FLUEXURAL TESTS UNRELIABLE—In a letter to the members of the National Sand and Gravel Association and the National Ready Mixed Concrete Association, Stanton Walker, director of engineering of these organizations, calls attention to shortcomings of the flexural test of concrete when used for acceptance or rejection of field work. Particularly noteworthy is the sensitivity of the test to moisture content of the test specimen. The test has been used in the past for proportioning concrete mixes, evaluating materials, checking the adequacy of curing or to determine when a pavement slab could be put into service; but recently some government agencies have been specifying concrete quality on the basis of flexural strength.

HOLING THROUGH, FIRST OF EIGHT—West Delaware Tunnel—second only to the 85 mile Delaware Aqueduct, to which it will become an appendage in New York City's water supply system—"holed through" its first section in a total 44 mile length last week. The contractor, Drake-Grafe-Tecon-Winston-Conduit, reports 13 miles of excavation completed and thinks 8¾ miles of tunneling from five headings in seven months may be a record.

powerful new concrete air entraining agent

There are *quality* reasons as well as *economy* reasons for using A. C. Horn's new-formula Ayr-Trap air entraining agent in concrete mixes. For one thing, Ayr-Trap is completely dependable—it complies with major official specifications including: **CRD-C-13-55 • ASTM-C260-54 • AASHO M-154-53 • Federal Specification SS-C-192a • Existing State Specifications.** It's guaranteed *not* to segregate, settle out or lose its efficiency during storage.

Ayr-Trap produces uniformly-dense masses which have higher resistance to freezing and thawing, spalling, chipping and cracking. This increased durability pays off in fine appearance for years to come. Furthermore, Ayr-Trap increases the concrete's plasticity—makes it easier to mix and pour. It also assures density and cohesion, less segregation and bleeding, permitting earlier finishing.

Ayr-Trap comes in homogeneous single and double strength solutions. You need less than 1 ounce of the single strength, or ½ ounce of the double strength, per bag of cement.

Like to know more about Ayr-Trap? For condensed data see Sweet's . . . for complete A.I.A. Specifications or new 4-page catalog write to Dept. H61-89.

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WASHINGTON OBSERVER

- **Atomic construction may be in trouble**
- **TVA bonds: Wait until 1958**
- **New boom coming for campuses**
- **Where should U.S.-state functions divide?**

● **Atomic construction authorization is in jeopardy because of a fight over public vs. private reactor development.** The House passed a $337 million bill, but it knocked out $58 million for federal construction of five power reactors. Senate Democrats think they have the votes to put the public reactor program back into the bill.

A compromise could be undertaken, but time is important now because Congress wants to go home. The urge to adjourn might block a compromise unless the Atomic Energy Commission relents in its opposition to the federal atomic power program. Senate Democrats are pressuring AEC to give in by withholding confirmation of two new commission members—John Floberg and John Graham.

● **The adjournment rush also may delay TVA expansion legislation until 1958.** The Senate-passed bill to permit TVA to issue up to $750 million in revenue bonds to pay for new facilities, is getting bogged down in the House. Pro-TVA members want to wait until next session, then drive for more liberal legislation.

Administratively, TVA is in serious condition and probably couldn't use bond authority very soon, anyhow. The three-member board now is down to only one man, Chairman Herbert Vogel, after the death last week of Raymond R. Paty, a Truman appointee. The White House can appoint another member soon, but the Senate has refused thus far to confirm Arnold Jones, whom President Eisenhower appointed sometime ago to an existing vacancy.

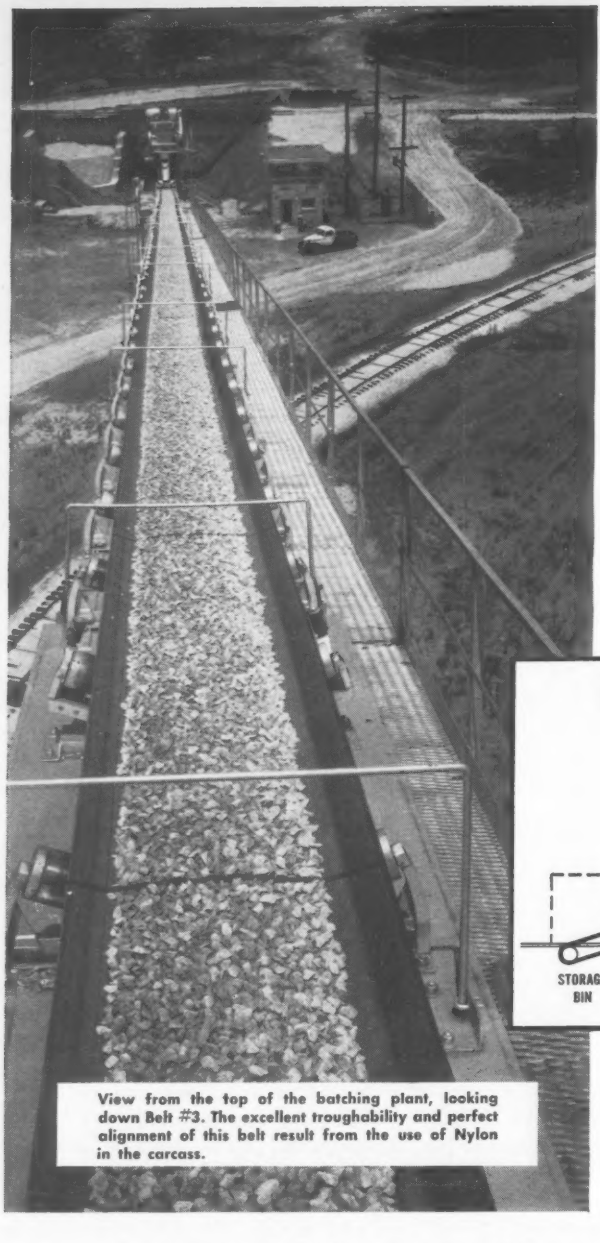
● **More federal aid for the college building boom may be in the offing.** Sen. Clifford Case of New Jersey proposes grants totaling $2.5 million to the states for surveying needs and developing plans for campus expansion. The proposal stems from a White House study group's new report that demands for college enrollment may double between now and 1970.

Already federal aid to college dormitory construction is a big item in aiding higher education. The Housing and Home Finance Agency is getting applications for loans amounting to about $25 million a month. The government has available for commitment some $258 million, but the Budget Bureau probably will set a rate for fiscal 1958 at considerably less, somewhere around $150 million.

● **First afterthoughts on returning federal-aid programs to the states are coming in.** President Eisenhower wants a new look at reducing big government ment in fields that states and cities "rightly" should handle. Last week at Hershey, Pa., a committee of governors faced up to the issue.

The best estimate of results: The states could take over such grant programs as pollution abatement, disaster relief, school lunch subsidies etc., if they were given taxing power over the nearly $150 million that Washington now collects in inheritance and a few excise taxes.

But the reverse was proposed, too. Gov. Victor E. Anderson of Nebraska feels the federal government should pay 100% of interstate highway financing, rather than 90%. And Gov. George M. Leader of Pennsylvania, is insistent that Washington should aid in school construction.

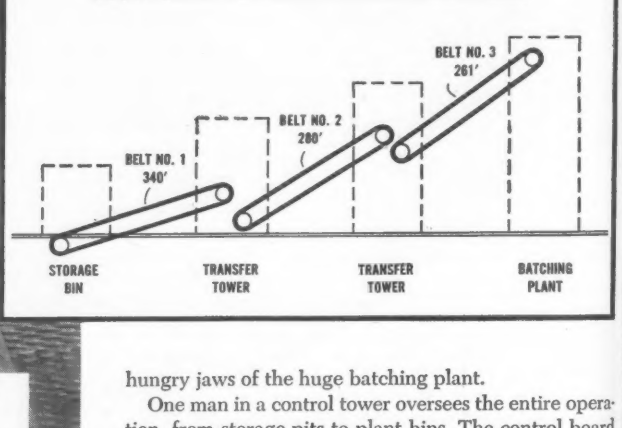


View from the top of the batching plant, looking down Belt #3. The excellent troughability and perfect alignment of this belt result from the use of Nylon in the carcass.

US RUBBER CONVEYOR BELTS

Push-Button Control and U.S. Conveyor Belts help turn out 120 cu. yds. of concrete per hour

FLOW CHART OF CONVEYOR BELT SYSTEM.



"This is the largest concrete plant* of its type in the world," says the plant's manager. "In aiming to turn out the best concrete at the lowest possible cost we require a highly mechanized operation."

And that's what this plant has. Almost 2,000 feet of U.S. Rubber's 30" wide U.S. Matchless patented Style XN conveyor belting carries raw materials through the reclaiming tunnel, then up a steep grade to a turn head—electrically controlled—and finally discharges the cargo into the always-hungry jaws of the huge batching plant.

One man in a control tower oversees the entire operation, from storage pits to plant bins. The control board tells him when a bin is getting low. By pressing a button he can start one of the three U.S. Belts hauling sand, stone, or other aggregates to the proper bin. "We expect many years' service from these belts," adds the plant's president, J. Roy "Cap'n" Pennell.

This is another good example of U.S. Rubber's Three-Way Engineering, in which "U.S." engineers work as a team with the plant engineers and the conveyor system engineers . . . to obtain the *right* belt for the job. This type of assistance, plus a complete line of conveyor belting, can be obtained at any of our 28 District Sales Offices, or contact us at Rockefeller Center, New York 20, New York.

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Is Public Law 660 a success . . .

. . . And have the grants-in-aid stimulated sewerage construction?

- **The states say yes**
- **The municipalities say yes**
- **And the figures say yes**

The Pollution Control Act—A Year Later

Marc Leggiero
Assistant Editor

Public Law 660, with its federal construction grants for sewage works, has gone through its first year of life and $38 million—part of the first $50 million of a $500 million, ten year program.

The 1956 federal act has a big job to do: stimulate sewerage construction in the U. S. and its territories by paying part of the cost of a municipality's pollution abatement project.

Is it doing so?

Yes.

And is it proving an administrative success?

Again, yes.

As of June 30, end of the program's first year:

- 446 projects had been approved and offered federal grants
- Total estimated construction cost involved is $166.8 million, with the federal government's share at $37.9 million
- 141 projects, totaling $54 million worth were under construction, and four projects costing $241,867 had been completed.

States, municipalities and the U. S. Public Health Service—the administering agency—are all pleased with the way the program has gone and gives indications of going.

• The states are for it—Checking with a number of state pollution control officials to get their reactions to the federal grants, has produced almost unanimous praise for the program.

Although an extremely small minority still contends that the program will hinder rather than speed sewerage construction, the overwhelming majority gave general assent that the program has supplied a real impetus to added sewerage construction. To quote a few:

Charles E. Carl, director of the sanitary division of the South Dakota Department of Health: ". . . has undoubtedly given impetus to the sewage treatment works construction program in South Dakota. A majority of the projects [offered grants] have been planned or designed since the federal grant program was established."

Clarence W. Klassen, technical secretary, Illinois Sanitary Water Board: "We feel that the program has given impetus to added sewerage construction in Illinois . . . however difficult to determine based on comparison with other years . . . conditions are not the same. We feel that without the program construction would have dropped behind . . . because of particularly bad bond market."

Dr. Berwyn F. Mattison, secretary of health, Pennsylvania Department of Health: "Among the eleven projects approved for grants during the 1957 fiscal year, we believe that a few would not have proceeded with construction without the grant program . . . hoping continuation of federal construction grants will result in a larger number of municipalities constructing . . . who would have been unable to finance such projects."

The fear that municipalities would hold back necessary construction until they could get a federal grant, has not been realized, according to those state people who are in a position to know.

• The municipalities are for it—Next step was to check with a number of municipalities that had been offered federal grants. Again, the concensus was that the program was a good thing. It could be cynically said that it would be a rare municipality that would not be in favor of getting money for nothing. But both state officials and regional PHS officials agree that, by and large, the municipalities have proved to be exceedingly conscious of the goal of the federal program and have been acting accordingly responsible. It was, after all, the American Municipal Association that conceived the federal aid idea and fought for its inclusion in the law.

Every municipality contacted, without exception, felt that its federal grant had turned the trick in some way. Some would not have been able to build without it. For others, it meant the difference between a hardship situation and one of minimum comfort in paying for the planned project. And for still others, the grant is making possible a faster, more comprehensive and more complete pollution abatement program than would have been possible had they had to go it alone.

A number of municipalities reported that the promise of a federal grant made the difference between voters approving or not approving a bond issue to finance construction of the sewerage project. This is true even where state aid, too, is available. In Vermont, for example, some municipalities are able to get outside help for 50% of the project cost—up to 30% from the federal government and 20% from the state.

The majority of the grants are going directly for construction. There are a number of cities, with big programs, that are using the grant to help pay the important overhead expenses such as bond issue financing fees.

To sum up, municipalities can now build what previously had been impossible, exceedingly difficult or somewhat incomplete.

• The figures are for it—There was the fear when the law was passed sewerage construction would suffer, not gain. It

. . . Federal grants fatten construction awards

would now seem that this fear may be laid to rest.

The federal act went into effect July 1, 1956, although its first grant offer was not made until December. A comparison of sewerage construction figures for the first half of 1956 with those for the first half of 1957 makes a good case for the federal aid program as a stimulant to construction.

Latest ENR sewerage contract award figures, for the first 31 weeks of both years, make 1957 a better year than 1956–the record year for such awards. For 1956, $354.3 million in sewerage contracts were awarded; in 1957, the figure is $341.3 million. However the 1956 figure includes the $80 million Allegheny County, Pittsburgh, Pa., sewage works project. Subtracting this from the 1956 figure–and for this comparison, it would seem legitimate to do so since such a project comes along but rarely–puts 1957 ahead by nearly $65 million. And according to ENR projections, by year's end the sewerage contract awards could top last year's record high, even without subtracting the Allegheny amount.

Still other figures point to the effectiveness of the federal construction grants. According to USPHS totals, which include only those elements eligible for federal aid–treatment works, interceptors and outfall sewers (ENR figures include laterals as well)–1957 is turning out to be a better year than last year's record year. January through June, the 1956 total was $223.7 million; for 1957, the total is $165.7 million. Again excluding Pittsburgh's $80 million (contracts awarded in January, 1956), the first six months of 1957 are $20 million ahead.

And the clinching argument is that this is being done in the face of unfavorable conditions, foremost among which is the tightened revenue bond market, a popular source for sewerage construction funds. The rising interest rates have been a depressing factor on the volume of new construction work, especially so in the case of smaller communities.

A special survey made for PHS by an outside consultant showed that 18 smaller communities in North Carolina, Maryland and Wisconsin met "considerable difficulty" in selling bond issues for sewage treatment works construction. This was true even for several of the communities which had been assured federal grants.

The ENR figures also are a strong argument. They have gone to the high level in 1957 even though industrial building and mass housing–major affectors of the dollar volume of sewerage contract awards–have dropped off sharply.

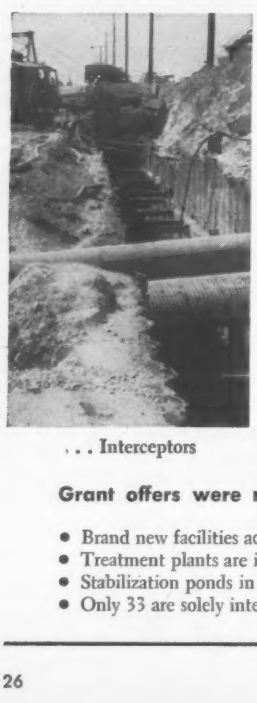
• **Who and what get money**–It had been planned and hoped that the federal aid would make the biggest impact on the smaller municipalities. The act provides for the federal government to pay up to 30% or $250,000–whichever is the lesser–of the cost of a municipality's sewerage construction project. Grant offers would be made upon application by the municipality to the regional PHS office for approval. State bodies, and not PHS, would decide which project had priority over others in their state for the state allocation. Payments would be made in three parts, the last coming with the completion of the project.

The program's aims in this respect are being realized. Of the 446 projects approved and grant offers made in fiscal 1957, only 38 fall in the $1 million or over category. The maximum grant offer of $250,000 has been made to only 43 of the 446.

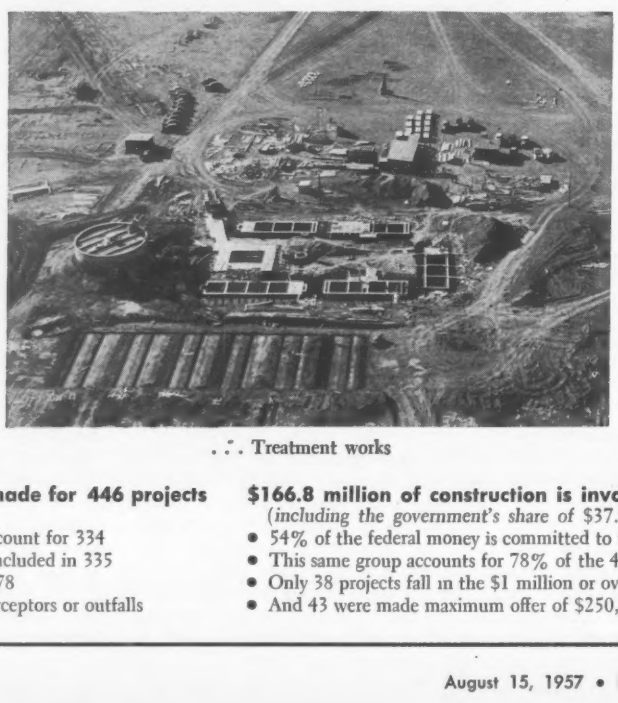
Smallest project for which an offer was made is a $6,430 extension to a treatment plant at Unity, N. H. Federal share here amounts to $1,929. Largest project is listed at $5.9 million for extensions and additions to a treatment plant in the District of Columbia. Federal aid offered is the $250,000 maximum.

Municipalities with populations of 10,000 or under account for 78% of the 446 projects and 54% of the $38 million. Cities of 50,000 and under are sponsors of 94% of the projects and have been offered 80% of the federal money. The really big cities of 500,000

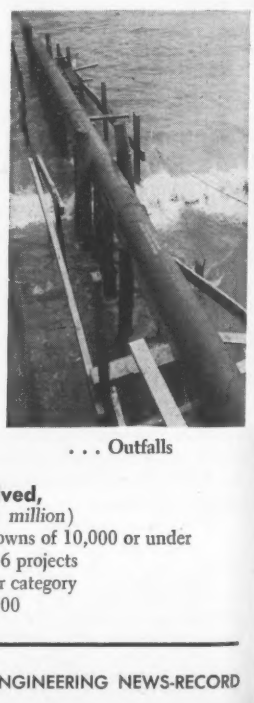
First year of the federal program helped build . . .



. . . Interceptors



. . . Treatment works



. . . Outfalls

Grant offers were made for 446 projects

- Brand new facilities account for 334
- Treatment plants are included in 335
- Stabilization ponds in 78
- Only 33 are solely interceptors or outfalls

$166.8 million of construction is involved,
(including the government's share of $37.9 million)

- 54% of the federal money is committed to towns of 10,000 or under
- This same group accounts for 78% of the 446 projects
- Only 38 projects fall in the $1 million or over category
- And 43 were made maximum offer of $250,000

or over, hold only 4% of the projects and account for about 7% of the federal money.

The federal grants for fiscal 1957 are going for projects that are concerned almost exclusively with new sewerage construction. Only 15 of the 446 projects entail simply remodeling or altering existing works. Brand new projects are the recipients of 334 of the federal grant offers. The remaining projects include some new work or some degree of extension and addition to present systems.

One example is North Dakota's 19 projects for which federal grants have been offered. All are stabilization ponds and appurtenances—17 brand new, one remodeling and alteration job and one extension and remodeling.

A very high number—335—of the 446 disposal projects include treatment plants. In addition, 78 projects include stabilization ponds. Only 33 do not include some sort of treatment works and are instead concerned solely with interceptors or outfall sewers.

• **Why only $38 million?**—Although Congress appropriated $50 million for construction grants for the first year, fiscal 1957, only $38 million had been committed by PHS by June 30, the end of the fiscal year.

The reason for this is simply that it took some time for the program machinery to be set up and operate smoothly. First grant offer came through in December, 1956, and then they started pouring out. So that, actually, the $38 million was committed in the short period of seven months.

The $12 million represents money that had not yet been asked for by municipalities in the states for which the allocations had not yet been used up by June 30. However, it is permissible under the law for unused funds from one year to be held over and allocated in the next fiscal year. Most of the states concerned have already indicated that even though its been a slow start they will easily use up last year's and this year's federal money.

• **$62 million for 1958?**—When Congress made appropriations for fiscal 1958, it cut $5 million, appropriating only $45 million at the insistence of the Senate Appropriations Committee, which said it intended doing the same for fiscal 1959. The Senators did this after the first year's experience showed that not all the states and territories were likely to submit projects for the full allotment. The Virgin Islands for example, says PHS, is not expected to ask for federal grants for sewerage construction.

But this $5 million drop is not likely to deny eligible requests. Congress permitted PHS to set up fiscal 1958 allocations on the basis of $50 million. And if such areas as the Virgin Islands do not pick up their full allotment, the money will be there for those states that subscribe for their full allocation. And should it be necessary, indications are strong that PHS won't have much trouble getting supplementary appropriations from Congress up to $5 million before June, 1958. This then brings potential federal money up to $62 million for fiscal 1958.

Already, on the basis of applications in process, there are unmistakable indications that all the $57 million will be offered in what is now the current fiscal year.

Since June 30, over 40 grants have been approved. And right now, PHS regional offices and state pollution control agencies have under review over 600 applications calling for $60 million of federal construction grants. In addition, municipalities are preparing another batch of projects that will call for some $12 million more as the federal government's share.

So there are in process projects totaling $72 million of federal aid money. However, some of the projects are sure to be ineligible for federal funds and there will also be a number where the voters will turn down a bond issue to construct the projects. Therefore, the federal money that will be available will probably cover the projects on hand.

As far as the states go, they are generally satisfied with the amount of federal aid allocated to their state. The feeling was that, of course, if they were given more money, they could use it, but recognized that the federal program was, to paraphrase one official's statement, merely one tool in the administration of the state's water pollution control program.

• **The system's working**—The check with state and PHS regional officials showed that while it took some time for the program to get rolling, it is now going well and very little additional trouble is anticipated.

The PHS regional offices—which receive the requests, review and approve them, and then make federal grant offers—are now in high gear and wading into fiscal 1958's lot. Although undermanned and dealing with a new program, the regional offices have received high praise from both state and city officials for the job they have been doing. They have proved themselves extremely cooperative, helpful and patient, according to reports.

The time elapsed from time of application to PHS to offer of a federal grant has ranged all the way from two weeks to nine months. However, according to PHS officials, two to three weeks should be the time for untroublesome applications, and three months the latest for the worst. The important thing is for the applicant to be thorough, making certain to submit the necessary documents along with the application—and being especially certain that financial authorization and the engineer's report are correct and complete.

Illinois reports that for its 18 projects, elapsed time from application to PHS to grant offer did fall between two and three weeks for each project. And the municipality that waited nine months tended to blame itself rather than PHS.

Generally, replies indicated that elapsed time ran from one to two months, and all parties expressed satisfaction.

• **Priority no problem**—States report having set up some formal system for rating a project's priority, except for a few states which said it was not necessary to do so since their allocation covered all requests for grants by municipalities.

The priority systems are going smoothly, according to the state officials, who also are generally satisfied with their own role in the program. A few did comment that the amount appropriated by the federal government to the states for administering the program ($2 million) should be increased to ease their burden.

Some of the priority systems reported are extensive and elaborate. Great weight was found to be given to whether or not the municipality requesting a grant was under state order to clean up a pollution condition. Many used a point system to come up with a project's priority.

Illinois, for example, assigns point values to pollution condition, abatement progress (voluntary progress gets highest rating in this category) and prevention progress. These are then worked with financial need and cost to arrive at a priority rating.

One aspect of the program that both PHS regional men and state officials are mutually happy about is that only one body decides priority—the state. Thus, the states don't feel interfered with, and PHS is spared the headaches of making that decision.

All in all then, the end of the first year of federal aid for water pollution control finds all concerned happily anticipating the second.

—Program in High Gear—

For fiscal 1958, there is $57 million of federal money available—and possibly $62 million

- There are already over 600 projects under review calling for $60 million of grant money
- And another $12 million of projects are being prepared

Photos courtesy of Atlas Powder Co.

1. DYNAMITE is loaded on truck.

4. FUSE is laced in primer.

The beginning . . .

. . . of the largest controlled blast in construction history began months ago with preliminary work and planning. Hundreds of thousands of dollars were spent to prepare the explosion that converted the solid rock mass into fill material.

Big Controlled Blast Makes Molehill Out of M

To get the more than 13 million cu yd of rock needed for the $49 million Southern Pacific Railroad rockfill across Great Salt Lake in Utah (ENR June 6, p. 34), Morrison-Knudsen is moving mountains—and the job isn't being done piecemeal. Explosive charges are not figured to produce thousands of yards of rock, but millions. The most recent blast, claimed to be the biggest controlled explosion in history, made use of 1.79 million lb of explosives and produced more than 2 million cu yd of manageable rock.

Site of the big blast is Promotory Point at the southern end of the peninsular-like strip of land projecting into Great Salt Lake from the north. Here, 1,300 ft apart, two entry tunnels, both wide enough for mine cars, were cut straight into the face of the rock by means of standard tunnel driving techniques. At a point 85 ft in from the portals and again 170 ft in, crosscut tunnels were made between the entry tunnels, and at right angles to them. Actually the corresponding crosscuts are not joined at the center. The front tunnels were stopped 60 ft short of meeting and the rear tunnels had 40 ft of rock between them. In all, the four tunnels were 2,400 ft long and they were built in about 100 working days.

At 50 to 60 ft intervals, pockets were cut in the walls of the crosscuts to take explosives. The explosives themselves consisted of 28,640 50 lb bags of a low order nitrocarbonate blasting agent and 7,160 50 lb cartridges of 60% dynamite. The 25 carloads of blasting material were brought by truck from the railhead to the job site where it was hand loaded on the mine cars. Each of the 40 pockets was hand loaded according to calculated need in a ratio of 80% nitrocarbonate and 20% dynamite. The rear tunnel loading averaged 51% to 61% heavier than the front tunnel.

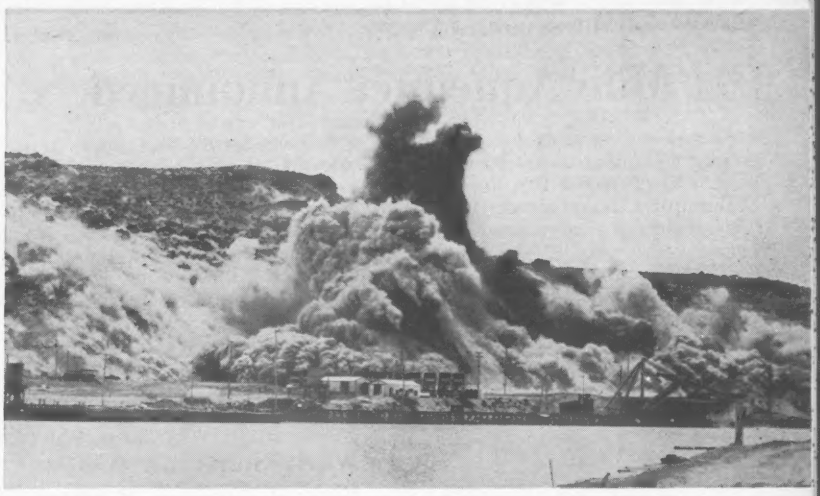
Primers were in 50 lb cartridges of 60% dynamite laced with detonating fuses.

Loading began in the deepest pocket in each crosscut, and after each pocket was fused, a specially designed track-mounted gravel machine packed the tunnel with sand up to the next pocket. The sand for backfilling was hauled into the tunnel in a screw-equipped hopper, which placed the material on a primary belt conveyor. From here the sand was moved to a small, fast conveyor that moved from side to side while throwing the material against the roof, and packing it tightly throughout.

2. MINE TRAIN carries explosives into tunnel.

3. INSIDE SHAFT, conveyor brings Amocol bags to pockets.

5. CONVEYOR backfills tunnel with sand.



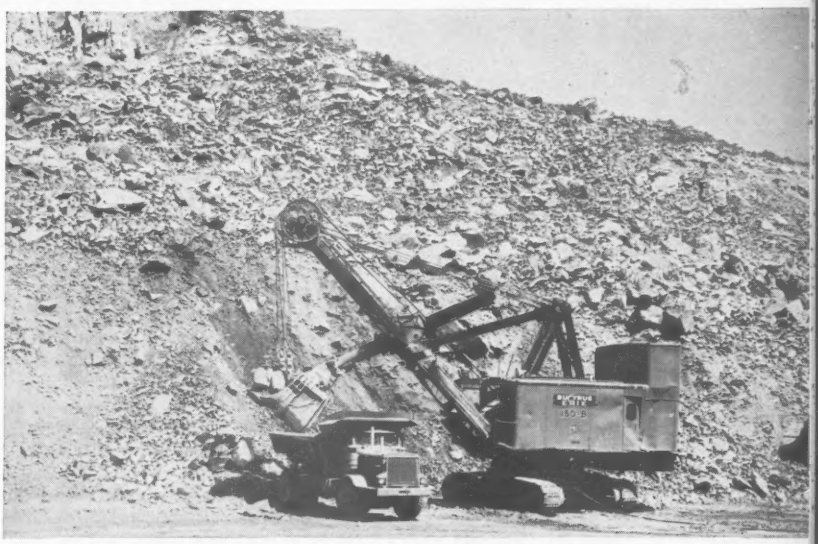
6. THE BLAST churns about 2 million cu yd of rock into manageable pieces.

Out of Mountain

Fusing was a carefully planned operation. Two separate trunks of detonating fuse in each crosscut and a "jumper" at every third pocket provided assurance that there would be no misfires. Each trunk extended from the innermost pocket to the portal of the entry tunnel. Here a millisecond delay electric blasting cap was connected to each trunk. Zero delay (instantaneous) caps were used on the trunks from the front crosscut while 25 millisecond delay caps were used for the trunks to the inside tunnels.

On July 21, the charge was successfully detonated from a distance of 3,000 ft by a 220 volt current running through a No. 8 gage wire.

Engineers of the Atlas Powder Co. assisted representatives of Morrison-Knudsen in planning and executing the blast.



THE END of the formidable rock formation is a pile of rubble which is easily handled by a 6½ cu yd power shovel.

NEW MOKELUMNE AQUEDUCT of 87 in. dia will be built parallel to existing 65 and 67 in. lines carrying water to east side of bay area at cost of $65 million. Hetch Hetchy aqueduct south of them serves San Francisco.

94 Mile Aqueduct Announced

To meet the soaring demand for domestic and industrial water on the east side of San Francisco Bay, the East Bay Municipal Utility District (EBMUD) has announced a huge construction program.

First projects to get under way will be a $65.5 million third aqueduct to carry water 94 mi from the Mokelumne River and a 17 billion gallon (bg) terminal reservoir to cost some $15 million. Aqueduct and reservoir are scheduled for completion by 1962.

The district announced it expects to expand after 1967 an existing reservoir in the service area from 13.5 to 35.5 bg and build a new 9.5 bg reservoir. No cost estimates were released for these.

The new Mokelumne aqueduct, to parallel two now in use, will have a diameter of 87 in., compared to the existing 65 in. and 67 in. aqueducts. The 67 in. pipeline and tunnel, completed in 1949, cost $21.7 million.

Capacity of the existing aqueducts, with pumping facilities in operation, is 175 mgd. With the third, that capacity will climb to 325 mgd.

EBMUD, which serves 13 incorporated cities and large unincorporated areas in Alameda and Contra Costa counties, foresees growth of the district's population from the present 1,000,000 to an ultimate of 2,578,000. By 1970, the population is expected to increase to 1,366,000, and by the year 2000, to 1,942,000. Water consumption should triple from present average daily demand of 130 mgd to an ultimate 340 mgd.

EBMUD has firm rights to 200 mgd from the Mokelumne River, in the foothills of the Sierra Nevada, and is seeking an additional 125 mgd. This supply, plus 15 mgd from local watersheds, can satisfy ultimate demand.

Existing service area reservoirs can store 33 bg. Completion of the new Briones terminal reservoir, expansion of existing upper San Leandro Reservoir and construction of proposed Pinole Reservoir will bring service area storage capacity to 81.5 bg.

EBMUD hopes to pay for the construction program without raising either tax or water rates, because of increased revenues and since existing bonds will have matured by that time. A general obligation bond issue will be necessary.

Work Starts on NYC's Biggest Sewage Works

Ground was broken recently for start of the first stage in the construction of $109 million Newtown pollution control project, largest water pollution control project in New York City.

Work was begun, without ceremonies, on the .7 mi long, 18-36 in. dia Johnson Ave. interceptor-collector sewer, which will be linked to the Morgan Ave. intercepting sewer, also to be built under a $10.3 million contract held by Andrew Catapano & Co. and Grow Construction Co.

The sewers will carry sewage now discharging into the East River from portions of Brooklyn and Queens to Newtown Creek treatment plant, which is scheduled to be built and be ready for operation in late 1963 or early 1964. The plant is to have a capacity of 310 mgd, increasing New York City's treatment capacity by 40% beyond the present 776.5 mgd of the 12 modern plants already in operation.

The Newtown project itself is the first stage of a $250 million second phase in the city's pollution abatement program.

The first phase, costing $125 million, will wind up work this month with completion of $46 million extension at Bowery Bay treatment plant.

The program is under the Department of Public Works; Commissioner is Frederick H. Zurmuhlen.

Explosion at Tunnel

Detonator magazine blows up at Boston sewage tunnel job; no one hurt

An 8 ft square magazine containing dynamite caps exploded mysteriously August 8 at 2 am near the south Boston shaft of a seven mile rock tunnel being completed beneath Boston harbor.

No one was hurt, but flying debris damaged numerous buildings in the area to the extent of broken windows and scarred surfaces. A nearby magazine housing dynamite was unscathed.

Cause of the explosion has not yet been determined. Police investigators are reported to be thinking in terms of some external cause. Two teenage boys who were sleeping out in a nearby park claimed they saw a fire in the cap house vicinity just before the explosion occurred.

• **Some fires**—That no one was hurt was probably because of a fire that broke out in the contractor's main office building—about 600 ft from the detonator house—a short time before the explosion. Contractor and fire department personnel were fighting this fire when the detonator house explosion shook the premises.

For a while last week there was theorizing that the dynamite caps were touched off by a radio transmitter on the fire department truck. But this is pretty much discounted now by investigators and, of course, by blasting engineers. However, use of two-way radio was banned in the area to prevent setting off any of the many unexploded caps that were scattered about.

The tunnel involved is a $12 million portion of the Boston Metropolitan District Commission's current $75 million sewerage construction program. It will carry sewage from the Boston area to what will be the world's largest treatment plant (500 mgd) on Deer Island. The tunnel has been holed through and lining, to 10 and 11½ ft diameters, has just begun.

The explosion did not cause construction crews to miss a beat. (A crew inside the tunnel didn't even hear it.) Work is scheduled to be completed next spring.

Prime contract for $11.9 million is held by a joint venture sponsored by Morrison-Knudsen Co. and including Peter Kiewit Sons' Co. and C. J. Maney Co. of Boston.

Federal Water Resources Money Voted

Fiscal 1958 construction money for water resources projects came through Congress unscathed last week as the Senate passed an $884 million appropriation bill, $70 million more than the House had voted earlier. Prospects were that the final bill would wind up closer to the Senate's figure as the two houses prepared to go to conference this week.

Federal public works construction did receive some lumps, however. Virtually all new projects were blocked under a "no new starts" policy and word came that Congress would not pass an omnibus rivers and harbors authorization bill this year. Actually, with $8 billion backlog of authorized projects, only the lack of new starts could have a damping effect on construction—and this in future years.

For the fiscal year that started in July, the Senate bill provides $701 million of actual new construction money, about the same as last year. The remainder goes for operational and investigational work of the various federal water agencies.

For new construction, the Senate bill gives the Corps of Engineers $532.5 million, compared to $520 million it got last year. Bureau of Reclamation gets $145 million, up a shade from fiscal 1957's $144 million. Bonneville Power Administration receives $22 million and Southwestern Power Administration $1.5 million.

Other federal agencies concerned with water resources, such as the St. Lawrence Seaway Development Corp., Soil Conservation service and TVA receive their money in other bills, but an estimated $48 million, $30 million and $14 million they will receive respectively brings new resources construction money close to a healthy $800 million. Not all of this will be spent in the coming 10 months, but carryover funds from previous years should put actual construction expenditure at the same $800 million level.

The story of the dead public works authorization bill was pork barrel and politics, as usual. Last year President Eisenhower vetoed the biennial omnibus bill because 42 of the projects included had not been approved either by the Army Engineers or the Budget Bureau. This year, the Senate approved a $1.6 billion bill that still contained many unapproved projects.

The House Public Works Committee did better by reducing the objected-to projects to 18 and the amount of the authorization to $1.4 billion. But there was still some question as to whether or not President Eisenhower would again veto the bill. When it came up for committee vote, Republicans voted almost solidly against it. At that point House Speaker Sam Rayburn stepped in and said there would be no bill taken up this year.

His move was believed aimed at forestalling a "pocket veto"—a veto of the bill after Congress adjourns—which would give no opportunity to Congress to override the veto. By holding the action over until early next session, Speaker Rayburn can confront President Eisenhower with a possible overriding of his veto in an election year when members will be less economy-minded and more concerned with getting projects for their districts.

In other actions important to construction, the Senate is about ready to take up military construction authorizations, approved last week by its Armed Services Committee. The committee approved $1.4 billion in new authorizations compared to $1.6 billion okayed by the House. Congress last year approved $2.1 billion of new spending authority.

The two houses also are in the midst of working out their differences on extending the direct loan program to veterans to stimulate rural house construction. The House approved a $200 million program extending it for one year, while the Senate okayed $50 million for two years. The measure increases from $10,000 to $13,500 the ceiling on individual loans.

Most significant innovation, though, is provision in the legislation for advance commitments to builders. Heretofore the loan went to the veteran who in turn had to act as his own contractor. What happened was that very little new construction took place and the program became pretty much one for purchasing old houses. However, with advance commitments to builders, it is expected that rural contractors will come in and get commitments for small groups of houses.

House proponents feel if they can get the Senate to accept their $200 million figure that it will result in a program that can provide a real lift for builders in many areas.

Skyscraper Walls Will Be Red and Gold

A 44 story office building with vermilion walls and gold-tinted windows will soon replace staid old Carnegie Hall, it was announced in New York City last week.

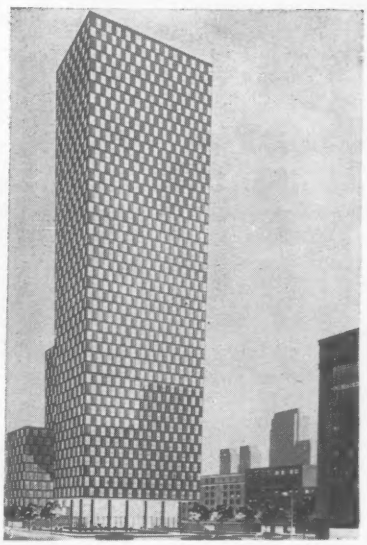
Completion of the $22 million project is expected by the end of 1960.

Demolition of Carnegie Hall, which has been drawing concert enthusiasts to W. 57th St. and Seventh Ave. in New York since 1891, will begin in the spring of 1959 when the lease of the New York Philharmonic Society expires. The society expects to move to the proposed Lincoln Square cultural center.

The colorful exterior of the new office tower will derive from prefabricated wall panels. Two stories high and about 5 ft wide, each panel will be half wall and half window. The lower half will be bright red porcelain-enameled steel. The top will contain gold-tinted glass framed in gold-anodized aluminum.

Horizontal joints in succeeding vertical rows of panels will be staggered by the height of one story, thus giving the facade a checkered appearance. The effect inside will be windows alternating with equal widths of solid wall.

The building will rise on 3 story columns from a sunken plaza. The main entrance, set back 40 ft on the Seventh Ave. side, will be accessible from the sidewalk by way of a bridge above the plaza.



The structure will contain 760,000 sq ft of air-conditioned office space and underground parking space for 300 cars.

Developer of the project is Louis J. Glickman, New York real estate investor, in association with Joel W. Schenker, president of the New York building and investment firm of Gregory-Roth-Schenker. Architects are Pomerance & Breines, of New York.

PUMPING HEADlines

By Peerless Pumps

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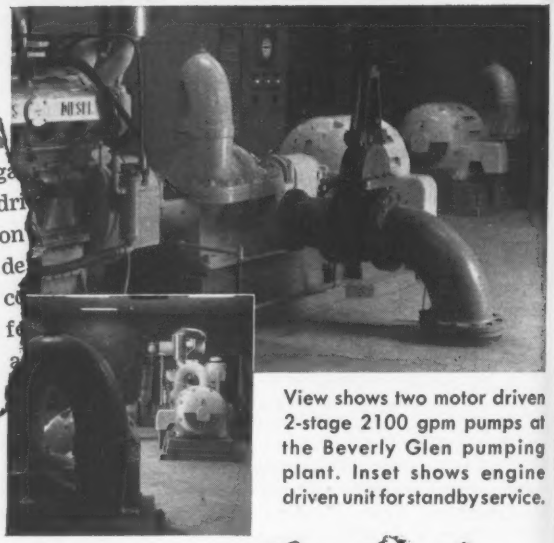

View shows two motor driven 2-stage 2100 gpm pumps at the Beverly Glen pumping plant. Inset shows engine driven unit for standby service.

View shows outdoor all-weather installation of three motor driven 2-stage 1125 gpm pumps at Girard-Woodland pumping plant.

245 FEET is the head on these three Peerless 2-stage Type 5TU15 pumps. Like the units above, these pumps also handle water from a reservoir inlet line, lifting it into an elevated tank, in this case of 1 million gallon capacity. The three pumps have a capacity of up to 3,000,000 gallons a day.

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ENR

The rockfill dam that will just miss a height record may set a new speed mark.

Brownlee Dam: Schedule Slashed

A new speed record for dambuilding may be set on Brownlee Dam in Hells Canyon.

Glenn C. Johnson, resident project manager for Morrison-Knudsen Co., Inc., says the $63 million project will be on the line next summer—34 months after the first dirt was dug on the site.

Brownlee is the first of Idaho Power Co.'s three dams licensed in the Snake River canyon between Idaho and Oregon. While Congress has prolonged the argument as to whether a federal high dam should still replace all three (Oxbow and Hells Canyon are the others), Brownless has been pushed to 60% completion on an accelerated construction schedule that has bettered even MK's expectations.

And while Glenn Johnson predicted record speed in Brownlee's completion, Idaho Power Co. announced that demand on its system on a recent day had peaked at 480,000 kw, a new record in the company's 41 year history. The surge was due mostly to increased use of power for irrigation pumping; the company saw it as indication of how close the margin is between supply and the Northwest's power demand.

• **50% less time**—Mr. Johnson said that ordinarily 4 to 4½ years would be allowed to build a dam of Brownlee's size. When completed, it will be the second highest rockfill dam in the world, yielding first place by a scant foot to a 396 ft high Milboro Dam in Japan.

"But," he said, "Idaho Power, recognizing the developing power shortage, asked Morrison-Knudsen to make a top effort. As things shape up now we will have power on the line from the first of four generating units next summer."

The rockfill that will form the downstream slope of the dam is building up rapidly from both the Idaho and Oregon sides of the river as trucks, operating round-the-clock, add material to the massive rock piles under action of water jets for compaction. The V-shaped gap between the two sides is narrowing perceptibly each day, and it is to be fully plugged by late fall. Both Idaho and Oregon sides of this downstream rockfill have only 50 ft more to go to reach maximum height; over 70% of its volume is placed.

Meanwhile, work is progressing on the upstream rockfill, a terraced structure which Johnson expects will be completed by early next spring. And work is in progress as well on the impervious clay core, to be sandwiched between the two rockfill faces of the structure. Built from a footing 115 ft below the bed of the river, the core had been constructed to a point just below the river bottom (in accordance with a prearranged work schedule) prior to high water in the river this spring.

• **Power tunnels done**—The four 540 ft, 28 ft dia penstock tunnels which will feed water to four power generating units have been drilled through solid rock and steel tubular lining is already being installed in unit No. 4, the first of these.

About 45% of the excavation work on the spillway has been completed, and about 50% of the intake for the power plants has been accomplished, according to Mr. Johnson.

Most of the generator parts for units No. 3 and No. 4 have been delivered and will be assembled next spring. The embedded parts of turbines for three units are also on hand; these will be put in place starting in December.

Much of the switchyard construction and installation has been completed. Steel towers for transmission lines from the generators to the switchyard are rising; the huge transformers are in place; the big circuit breaker is being set on its concrete base and switchboards are being installed in the already completed switchyard control building.

At present there are about 1,400 persons employed on the project. About 1,500 will be on the job when the construction peak is reached in October or November.

"We've got a construction deadline to meet," says Project Manager Johnson. "We aim to meet it. Idaho Power has a power shortage to beat. We're going to help them beat it."

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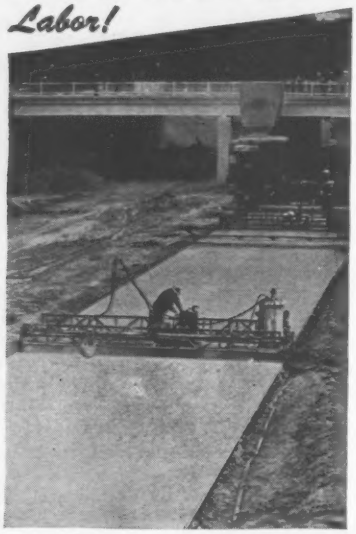

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Briefs

• **Judgment against pile driver**—A California superior court jury returned a $15,000 verdict against three defendants in a court action brought on by damages done to neighboring buildings while foundation piles were being driven for the Equitable Building in San Francisco. The defendants—Equitable Life Assurance Society, owner; Dinwiddie Construction Co., general contractor; and Raymond Concrete Pile Co.—will appeal the verdict.

• **Air conditioning for AF houses**—87 houses being built for military personnel at Sewart Air Force base in Tennessee are to be equipped with year-round air conditioning systems. Total cost for the air conditioning will be about $130,000. Installation of the 87 systems is supposed to be the largest air conditioning project ever done in Tennessee at one time. E. P. Wilson & Son, Nashville, is general contractor for the housing project. Marr & Holman, Nashville, are the architects and engineers.

• **Electrical diagrams standardized**—The American Society of Mechanical Engineers has readied for distribution a proposed Section 15, "Electrical Diagrams," for the American Drafting Standards Manual Y14. Interested parties can obtain a copy of the tentative draft for criticism and comment from Frank Philippbar, Standards Dept., American Society of Mechanical Engineers, 29 W. 39 St., New York 18, N. Y.

• **Consulting engineers organize**—A new organization to be known as the Consulting Engineers' Association of Michigan was formally organized in Lansing, Mich., June 28. A constitution and bylaws were adopted and W. B. MacWhirter of MacWhirter & Associates, Grand Rapids, Mich., was elected president of the association.

• **Aluminum dome**—A new auditorium being built by the city of Virginia Beach, Va., will be roofed by an aluminum dome. Kaiser Aluminum & Chemical Corp. designed and will fabricate this dome. It will be similar to a dome built by Kaiser in Hawaii (ENR Feb. 14, p. 26). Expected to cost less than $120,000, the dome will be 145 ft in diameter and 49 ft high. About 2,000 persons will be accommodated in the auditorium. A similar dome will be built in Johnson Park, Tex., as an exhibition hall.

• **Delaware River dam**—Gov. George M. Leader of Pennsylvania has signed into law a bill passed by the 1957 legislature to permit shifting of the proposed Wallpack Bend Dam on the Delaware River downstream to Tocks Island. The site shift was recommended early this year by the Corps of Engineers. Purpose of the bill is to clear the way for further planning by both Pennsylvania and New Jersey, who would construct the dam primarily for water supply. The states hope for a financial assist from the federal government for flood control benefits.

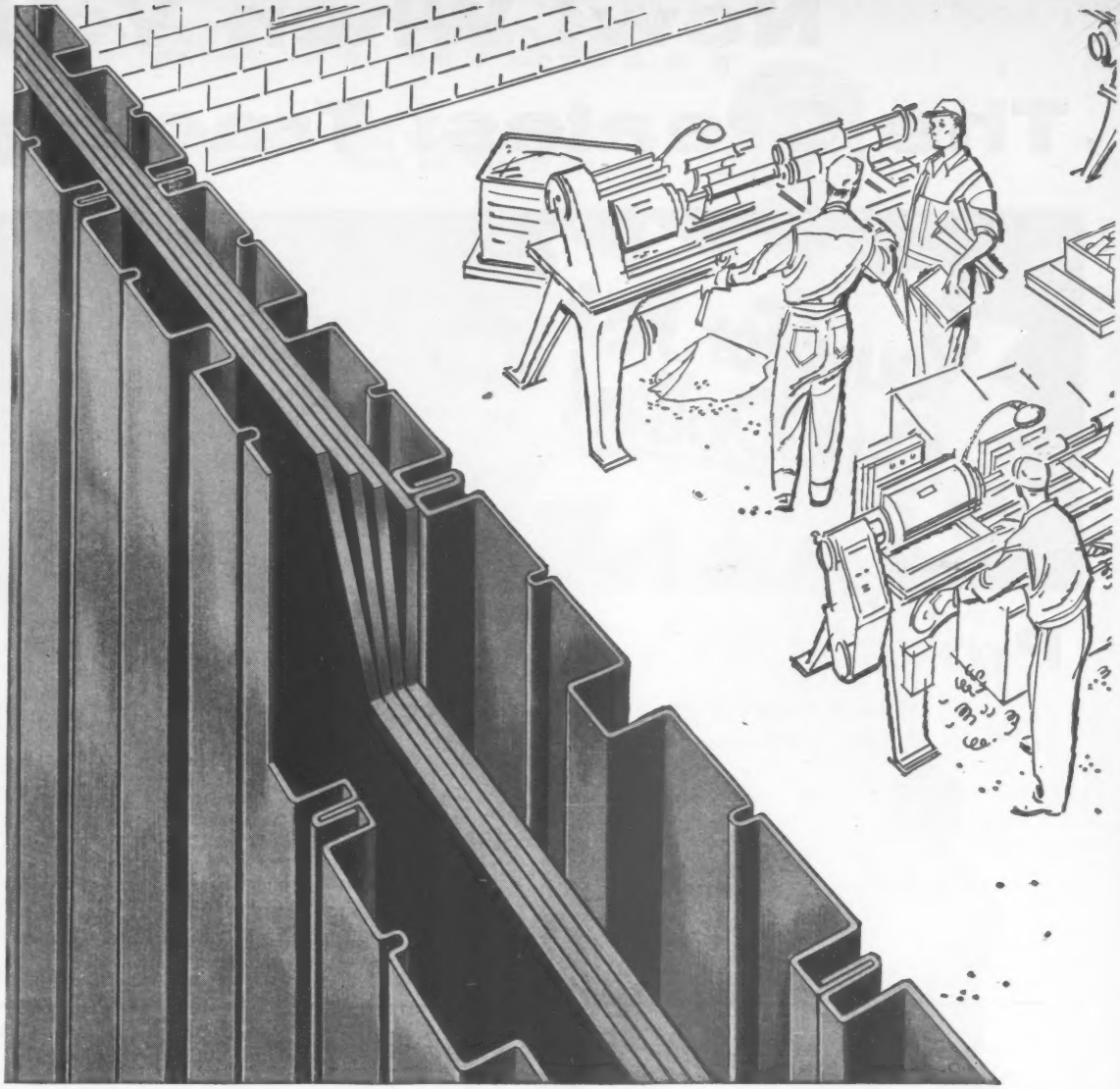
• **Denver air pollution**—A U.S. Public Health Service report urges Denver to spend between $38,000 and $80,000 annually and the surrounding tri-county area from $26,000 to $45,000 on anti-pollution measures. The report states that vehicle exhaust fumes, burning refuse and a few manufacturers are the principal sources of air pollution in the area.

• **Columbia River dams**—Grant County Public Utility District officials report that expenditures on Priest Rapids Dam on the Columbia River amounted to $17.5 million up to June 1, with work 14% complete. The PUD has also spent $284,675 on preliminary work for upstream Wanapum Dam, which will be started next year.

• **Show at Grand Coulee**—A nighttime floodlighting system designed to be "nothing short of spectacular" is in the works for Grand Coulee Dam on the Columbia River. About 750 wide-beam 1,500 watt lamps will focus on the dam's spillway, which provides a waterfall half as wide and twice as high (350 ft) as Niagara Falls. The Bureau of Reclamation has placed an order with the General Electric Co. calling for completion of the lighting installation by Sept. 1.

• **ASCE peak**—Membership in the American Society of Civil Engineers last week passed the 40,000 mark, announced executive secretary William H. Wisely. There are also 10,000 prospective members in 135 student chapters. The society now has 75 regional sections and 63 branches.

• **Good construction pace**—Construction of the final phase of an $11 million sewage disposal system for Nashville is running ahead of schedule and completion is expected by April, 1958, according to Karl Stallings, city public works director. Work is proceeding at a big treatment plant and two pump stations; the interceptor system, except for connections, already has been completed.



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In Mexico City

Among the few structures that collapsed was this waffle-slab building with steel and concrete columns, which may have lacked adequate provision for shear transfer from slab to columns.

Earthquake Revealed Defects in Design and

GAP of 6 in., formed when sidewalks settled in quake but building on piles didn't, is inspected by Jose Cuevas, Mexican engineer, and the Author.

Frederick S. Merritt
Senior Editor

The earthquake that shook Mexico City in the early morning of July 28 affected principally the taller buildings. Few under five stories high were damaged if they had good foundations and were not pounded by adjoining buildings.

Authorities are not yet finished counting the number of structures over five stories that need extensive repair or should be demolished.

Examination of many tall buildings in the business and hotel district, which was shaken severely, reveals that faulty design and construction practices were responsible for much of the damage. Nevertheless, there are several reasons for believing that the buildings that were designed to the highest of current standards and escaped this shock unscathed—including a 43 story skyscraper—may not be as fortunate in future earthquakes.

One important reason is the considerable variation in intensity of shock in the Mexico City region. It appears highly probable that due to peculiar subsurface conditions the shock may have been many times as severe on some buildings as on structures only a few hundred feet away.

Another significant factor is the period of the shock waves. There is much evidence that the peak vibrations of the ground in this quake coincided with the natural frequencies of many of the tall buildings that were damaged severely. Thus, with ground and structure moving simultaneously in the same direction, the forces acting on the buildings built up rapidly and almost tore them apart. It is possible that many of the tall buildings that escaped this earthquake did not have the same natural frequency as the ground movements; in a severe future shock of resonant frequency they might not be so fortunate.

• **Buildings founded on water**—It would be hard to find, outside of Mexico City, more difficult foundation conditions for a building solely under static loading, let alone seismic forces. One Mexican engineer estimates that poor foundations were responsible for the damages in about half of the hard-hit buildings.

TYPICAL DAMAGE to Mexico City's tall buildings consisted of shattered walls, cracked partitions, broken windows and tilted frames.

igand Construction

The city is located between high mountains in a wide, flat valley about 7,400 ft above sea level. Most of it is on land reclaimed by filling in Lake Toxcoco. The rest is on natural islands, which offer firmer subgrade. In addition, the older fills are more consolidated than the newer.

Throughout the filled-in areas, the water level is within a few feet of the surface. However, pumping of this water for community use has been lowering the water table, causing these areas to settle, in some places at the rate of more than 12 in. per year.

Buildings on spread footings may sink at the same rate as or faster than the city streets. But structures resting on piles stay at a nearly constant level, and within a few years their ground floors may be several feet above the street. Furthermore, in very few cases do the buildings settle uniformly.

To counter the settlement, several buildings in Mexico City have been designed with concrete box foundations to float in the subsurface "soup." In addition, provision is included to right them if they should tilt while settling. The National Lottery Building and the 43 story Latino-Americana tower, which survived the 'quake unharmed, are two outstanding examples of this type of construction.

• **Variable substrata**—In the downtown area, where most of the tall buildings are congregated, the fill or archeological deposits extend to depths of from 4 to 20 ft. Below to a depth of about 30 ft, are a series of alluvial and volcanic sediments. Under that, to 100 ft below grade are thick layers of soft clay with bentonitic characteristics, separated by strata of volcanic solids. The clay has a very high water content—up to 300% (weight of water to solid matter). In this state, it is easily compressed and almost impermeable.

At about 100 ft below ground level, is a 25 ft thick layer of fine sand and gravel, cemented with calcium carbonate and clay. Many buildings are supported on bearing piles driven into this layer.

It is worth noting at this point that Mexican practice in the past with timber piles left much to be desired. The piles were driven in two or more sections with a 6 x 8 in. tip and 10 to 12 in. butt. The sections were spliced with a simple dowel in the center, or a dowel and a metal ring around the outside of the splice. There is some evidence of settlement due to buckled piles, and several Mexican engineers suspect the splices.

Below the layer to which piles are usually driven is about 30 ft more of highly compressible clay. At greater depths is a series of alluvial deposits of sand, silt and andesitic gravel.

• **Why the shock varies**—With islands of firm ground interspersed in the saturated clay and with various layers of subsoil at different depths, the shock wave of an earthquake does not travel freely through the ground. It undoubtedly bounces back and forth between strata, reflected and refracted.

In some places, the vibrations may cancel out. In others, they reinforce each other. Emilio Rosenblueth, consulting engineer, Mexico City, believes the magnification factor may reach 12 or more. This can explain why some buildings may have escaped damage while comparable structures nearby suffered severely. In one case, a building previously condemned as unsafe came through the quake without additional injury.

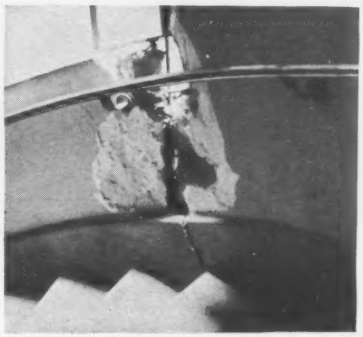
(*Continued on page 40*)

TILT of sidewalk to nearly 45° when building settled surprised John Gould, San Francisco, consulting engineer, investigating the damage.

. . . Quake shows up design defects

BADLY DAMAGED International Building (right) was left tilted, with a V-shaped gap between it and adjoining 10 story structure. Such deformations occurred frequently.

COLUMN in the International Building failed.



WALL along circular stairs cracked through in several stories at windows.

• **More quakes to come**—The July 28 earthquake originated outside the Mexico City Federal District. In fact, Chilpancingo, 55 miles northeast of the Pacific Coast resort of Acapulco and 145 miles from Mexico City, was hit even harder (estimated at 10 on the Mercalli scale).

While at Acapulco, the top story of a 13 story, reinforced concrete hotel under construction at the time for the Hilton chain collapsed.

Some geologists have reported that the quake was caused by the formation of a new volcano on the southwest coast of Guerrero near Chilpancingo. They predict additional shocks (some with intensity of up to 5 on the Mercalli scale occurred last week), with perhaps another violent one in the not too distant future.

• **Biggest quake**—The shock that hit Mexico City is estimated to have had an intensity between 7 and 8 on the Mercalli scale. Equivalent maximum acceleration is figured by several Mexican engineers to be between 0.05g and 0.10g. And the waves had peak periods of about 0.9 sec and 1.8 sec.

This is the worst shock the city has had since records were kept beginning in 1900 (at Tacubaya, D. F.). The Mexico city seismographs did not function during the quake.

Previously, there had been no reports of shocks of intensity 8 or higher in Mexico City. Three are believed to have been of intensity 7, and there were several hundred of weaker intensities.

As a result of this experience, and because until recently there were few buildings in the city over 12 stories, Mexico City engineers believed there was little reason for paying special attention to seismic design. However, they became more concerned about ten years ago when an 18 story reinforced concrete building partly collapsed in a quake.

• **What the code requires**—The Federal District Building Code dates back to 1942. It contains provisions for seismic design. However, tall buildings, which were erected in great numbers in the last 15 years, are designed according to the judgment of consulting engineers.

The code requires that joints between different structural elements be designed to resist at least as much as the elements they join. Each structure should be designed and built to oscillate as a unit. (However, many buildings that were damaged in the July 28 temblor were built with spaces between sections covered with masonry or metal plates, which were destroyed.)

Foundations are required to be designed so that the structure will not slide or overturn and so that joints between piles and foundation girders or slabs will not fail. No pile should be overstressed in a quake by more than 33%. Nor should any point of the bearing area of the ground or the foundation elements and joints be overstressed more than one-third.

Buildings need not be designed for simultaneous action of wind and earthquake. Seismic design computation must be made for structures over 50 ft high or with a height-width ratio over two or intended for use by large groups of people.

The code provides seismic design coefficients varying from zero for unimportant structures to 0.10g for various types of occupancies. For most office buildings, factories, hotels and houses, the coefficient is 0.025g, constant for every story. (In contrast, codes of U. S. cities in seismic zones, based on dynamic analysis, increase the coefficient for upper stories.) The seismic shear at any level is the coefficient times the dead plus live loads for all floors above that plane.

JOINT between sections of a long apartment house opened wide and . . .

. . . **SETTLEMENT** of the 7 story wings dropped floors out of alignment. An outside stairway of a 10 story building in this project toppled to the ground.

The July 28 earthquake demonstrated that the code provisions are inadequate.

• **Investigations under way**—The Federal District government, following the quake, took immediate steps to protect the public by cordoning off hazardous areas and shoring up damaged structures. It also appointed an investigating commission, headed by Fernando Hiriart, Federal District Water Works Director.

The commission, in turn, established 22 committees of three men each. These committees are now at work examining the taller and more important of the damaged buildings. Only a few reports have been submitted.

As of August 5, Mr. Hiriart reported that none will be condemned. However, he believes that in several cases the owners will find demolition and reconstruction less costly than repairs.

A separate commission also was appointed to determine whether the Benito Juarez housing project of 4, 7 and 10 story buildings should be condemned. These structures, built of reinforced concrete, are long and narrow and have brick walls above the second floor.

Each of the taller buildings has an inside, centrally located elevator and an outside stairway, with steps cantilevering from and circling a vertical concrete shaft.

During the quake, one of these shafts collapsed, toppling the stairs to the ground. The stairs of several others became partly detached from the buildings but did not fall over.

The pile-supported tall buildings in this group settled at the ends. Because of the skew, elevators jammed in their shafts. The lower buildings, probably on spread footings, sank 12 in. or more, tilting adjacent sidewalks about 45 deg.

Long, narrow buildings subdivided by joints were damaged when the sections pounded each other during the quake and were left with a permanent lean. However, surface examination of exposed structural members and masonry end walls reveals little damage to these components.

• **How low buildings fared**—Probably because of the difference between the period of ground vibrations during the quake and their natural period of vibration, nearly all low buildings in Mexico City came through with no serious damage. Edŭardo Espinosa, consulting engineer, Mexico City, believes the older low buildings survived because the walls acted as shear walls.

It is also noteworthy that almost all the one-story, thin-shelled buildings, including Felix Candela's hyperbolic-paraboloid umbrella roofs (ENR May 16, p. 36), escaped unharmed.

Three or four buildings about eight stories high collapsed. From all reports, these failures were due to faulty design or construction. For example, one reinforced concrete apartment house is said to have had its columns turned with the axis of smallest moment of inertia parallel to the narrow dimension of the building.

Another, of flat-plate construction, with light exterior steel columns and interior reinforced concrete columns, may have failed because of inadequate shear transfer between slab and columns. There was no eveidence of special provision for shear of the concrete columns, and the steel members apparently had for the purpose only a channel with web attached to the column and flanges protruding into the slab.

The floor had been cast on precast concrete boxes, and during the shock some of the boxes fell out. The question may well be raised as to whether such waffle-slab design offers sufficient resistance against horizontal torsion.

. . . Property damage was high in Mexico City quake

COMPLETE COLLAPSE of this six-story apartment house caused the death of 33 persons. This was approximately half of city's total death toll in the earthquake.

Among the low buildings of importance that were seriously damaged is the 5 story, reinforced concrete Registro Publico de la Propriedad (Hall of Records). Seated on "controlled" piles (with built-in jacks to adjust for settlement), this structure has heavy masonry walls above the second floor; no walls in the first story. The heavy mass of the superstructure rests on two rows of large-diameter tapered columns, between which, in the narrow dimension of the building, span relatively shallow haunched girders. The haunches are heavily reinforced. However, a sizable portion of the large-diameter, bottom reinforcing bars terminate at the end of the haunch.

The result of the heavy mass oscillating on the relatively flexible stilt-like columns during the quake was two-fold. First, the ground was cracked all around the buildings. Secondly, the concrete at the intersection of the haunch and horizontal part of girders spalled, exposing the hooked haunch bars; diagonal cracks extended upward from the intersection toward the nearby column. Stirrups appeared to be ineffective against the cracks.

Similar stilt-like designs used for the low concrete buildings at the University of Mexico, founded on an old island, suffered no damage. However, different details were used for those buildings, and there is no evidence that the shock was as intense at this location.

• **Tall buildings hit hard**—Since the official investigating committees have not yet completed their reports, it is impossible to estimate with accuracy the dollar value of the damage to Mexico City's tall buildings.

One lesson is obvious from inspection of the city. The quality of construction and the degree to which use is made are far more important in determining of current knowledge of seismic design the ability of a building to survive an earthquake than whether the structure has a steel or reinforced concrete frame or whether the walls are masonry, glass or tile. This is proved by several high buildings that were undamaged, whereas adjoining structures were hard hit.

Many tall buildings in the downtown area suffered only broken windows, spalling of the facade and slight plaster-partition cracking. In some lobbies with marble facings, the marble was shaken off or badly cracked. Yet, there are tall, narrow steel-frame buildings with no broken glass in floor-to-ceiling windows.

In nearly all cases where interior or exterior facings spalled off the backup, there was no evidence that the facing had been held in place by metal anchors —only by mortar.

Many examples are evident of reinforced concrete walls sheared through at floor level. In many cases also, the walls in addition, cracked away from the columns. Frequently, whole wall panels fell out. There were no dowels between walls and structural framing. If the shock had not occurred at night, when the city was asleep, the falling debris would have taken a heavy toll of lives.

Several tall buildings in the downtown area sank 4 to 6 in. during the quake. Many tilted out of plumb more than 1 ft horizontally in 100 ft of height, although in some cases the tilt was not all due to settlement but because the frame was too flexible. Sometimes, the streets tilted with the buildings; often gaps were left between sidewalks and buildings, as structures and streets settled different amounts.

It is significant that none of the tall buildings overturned, despite poor foundation conditions.

Adjoining buildings of different height slammed against each other and ended up considerably out of plumb, with wide V-shaped cracks between them. This also happened to tall buildings subdivided by joints. But the damage was particularly severe where the floor levels in adjoining buildings did not line up and the floor slabs hammered against the columns. In some cases, reinforced concrete columns were knocked out of alignment.

There is also an outstanding example of the disadvantage of not tying together two sections of a building at an angle. One office building consists of two wings forming an L, with a masonry wall at the intersection to cover the 3 ft wide junction. The upper part of that wall was destroyed; the lower sections were badly cracked.

• **Excessive flexibility proves bad**—Many buildings turned out to be too flexible, as evidenced by popping out of exterior walls, broken windows and severe partition cracking. However, in some cases the structural framing did not escape unscathed.

One 12 story apartment house appears to have steel columns that are much too light for the height of the building. Several of these buckled badly in the second story. Bulging of masonry walls at upper levels may be a sign that higher column tiers may also have buckled.

A 13 story, reinforced concrete office building suffered serious plaster-partition damage from the first to eight floors, some failures of the exterior walls and many broken windows. Diagonal-tension failures of stairwell beams, spalling of columns were evident.

A reinforced concrete building with a 17 story tower and 10 story wings not only suffered in the same way as others with joints between sections but also received severe structural damage. Founded on timber piles, this edifice had been badly injured in a previous temblor. It was later repaired by spraying a thin shell of concrete around the columns, which had been cracked, and adding haunches on the beams. In the July 28 quake, this reinforcement fared badly.

A column sheared through completely between the seventh and eighth floors. At upper and lower levels also, this column was badly cracked. Stairwell columns were severely damaged. A 4 in. thick, reinforced concrete exterior wall around the circular stairwell cracked open vertically in several stories. Between the second and fifth floors, the haunched beams spalled severely at the

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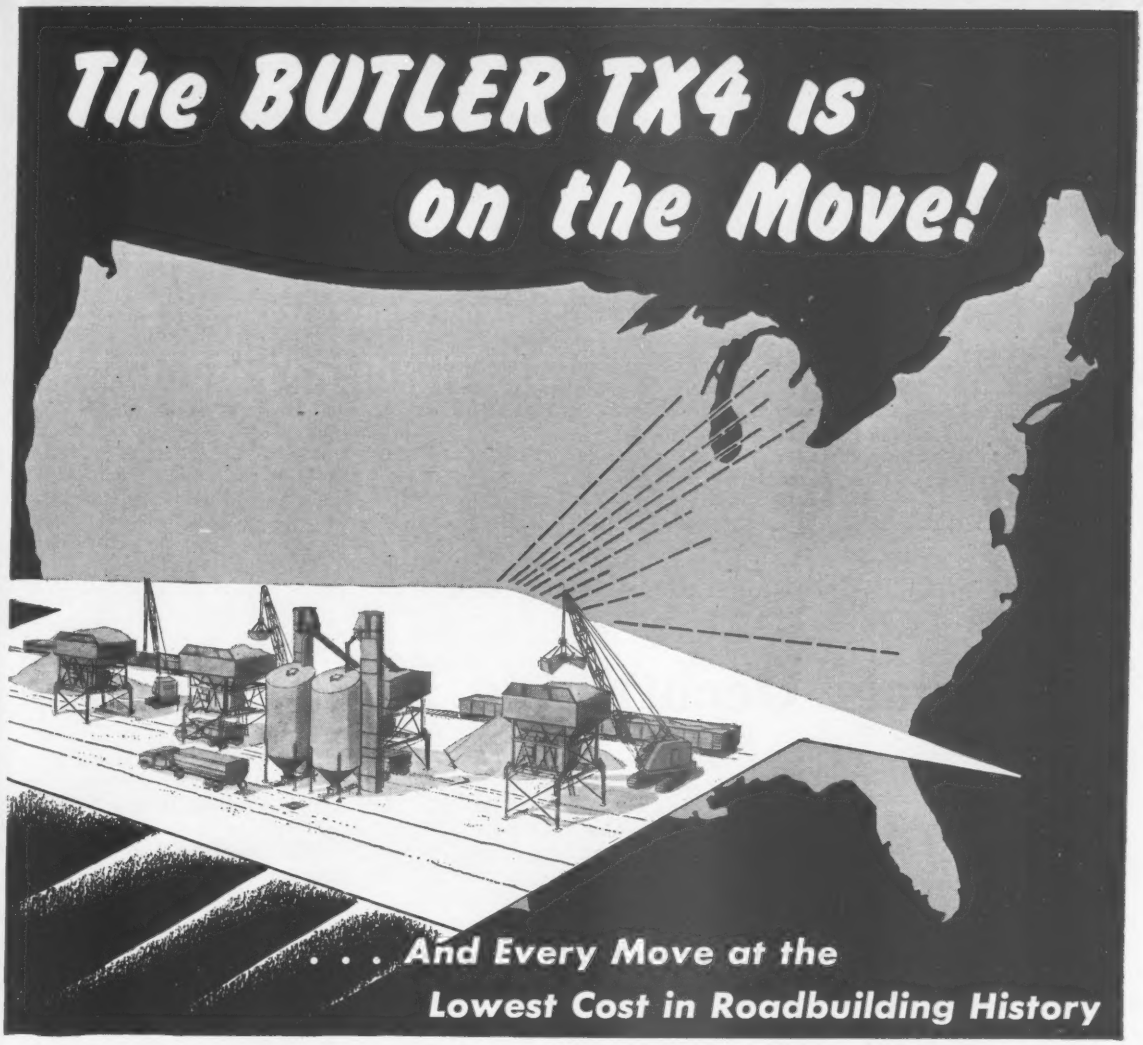

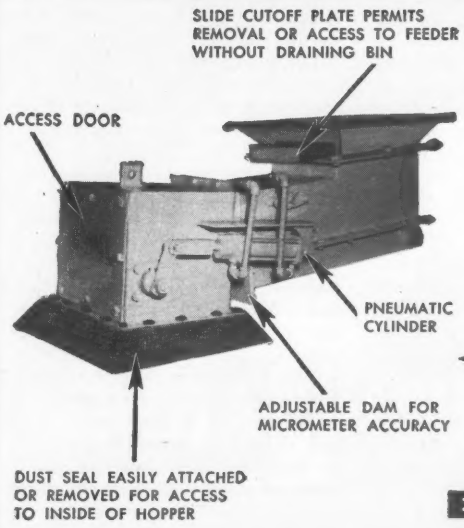
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ends of the haunches. Diagonal cracks extended from the spalled areas upward toward the columns.

In contrast to these badly damaged structures, the 43 story, steel-frame Latino-Americana tower stands as a symbol of the value of painstaking attention to detail in aseismic design (see below). It suffered only minor partition damage. Yet, there is evidence that the shock intensity at the building may have exceeded 7 on the Mercalli scale. Built-in recorders noted the relative deflections of floors at several levels.

It is noteworthy that the peak periods of the ground vibrations 1 and 1.8 sec straddle the natural vibration period of the structure, which is estimated at 1.5 sec. So there is still the unanswered question as to how the building would fare if a future earthquake should have a period of 1.5 sec.

• **Afterthoughts**—Mexican consulting engineers naturally are studying the earthquake effects intently and busily reviewing their past design practices. They are almost unanimous in the conclusion that the building code needs revision, and in particular that strict enforcement of its provisions is necessary.

Javier Barros-Sierra, director of the National School of Engineering, University of Mexico, says the code should be modified to require dynamic analysis or higher empirical seismic coefficients, especially for important buildings. Also, a minimum distance between buildings should be specified, to prevent them from striking each other in a temblor.

Adolfo Zeevaert, chief engineer for the owner of the Latino-Americana tower, also is sold on dynamic analysis —a technique used for the design of that skyscraper.

Emilio Rosenblueth recommends that the following be considered in future code revisions:

1. Walls should be securely anchored to floors and columns.
2. Buildings should be made stiffer than required by the present code.
3. Higher lateral forces should be used in seismic design. (However, the effects of damping of vibrations by walls, partitions, etc., should be included.)
4. A distinction should be made between different foundation conditions in imposing design seismic forces.
5. The relative deflection of floors should be limited.

Jose A. Cuevas, consulting engineer, Mexico City, warns that in the future it will be necessary to give more consideration to buildings adjoining a new structure. In particular, foundation conditions will have to be checked; also, the height of the floors, to prevent floor slabs striking columns. Stability of buildings will have to be investigated.

Mr. Cuevas strongly urges that an experiment station for seismic studies be established—perhaps under the auspices of the United Nations—to develop improved design criteria.

No Damage Occurred to Tallest Building

OFFICE BUILDING 43 stories high suffered only minor partition cracks.

The most encouraging news from earthquake-struck Mexico City is that the city's one true skyscraper, the 43 story Latino-Americana tower, rode the shock waves undamaged, even to its window glass and partitions.

That ground movement occurred at the site is attested by recording instruments installed on the 1st, 25th and 39th floors to measure relative floor displacement. They showed movements of 2¼, 2¾ and 1¾ in., respectively. It is estimated that the sway at the top of the tower was on the order of 12 in., with the building oscillating for the most part in the second mode.

Built for a life insurance company called Latino Americana Seguros de Vida, S. A., the building was completed early this year at a cost of $4½ million. Several U. S. companies contributed to its construction, including Western Foundation Co., which drove 361 of its button-bottom concrete piles to compact and level sand 117 ft below street level, and Bethlehem Steel Co., which fabricated and erected the 3,600 ton steel frame. In addition, Prof. N. M. Newmark of the University of Illinois was consultant on the seismic design of the building.

A year ago in June, at the World Conference on Earthquake Engineering, held at the University of California, Leonardo Zeevaert, consulting engineer of Mexico City, and Prof. Newmark presented a joint paper on the design of the Latino-Americana tower, which brought out some of its special characteristics. In this paper it was pointed out that the building was nearly twice as tall as any other building in the city, and this, in combination with the poor foundation soils in the area, made it necessary to design a light, but rigid structure.

The building is approximately 120 ft square at street level and 70 ft square in the main tower section, which runs from the 14th to the 38th floor. The top of the building (roof over the 43rd floor) is 456 ft above street level, while a television tower adds another 138 ft. There are four basement levels extending to a depth of 44 ft.

The foundation was designed to behave as a floating concrete box set upon piles, with the load shared about equally between uplift on the box and the piles.

Tests showed the piles capable of taking 90 tons each without deformation, and a working load of 60 tons was assumed under the worst possible condition—no uplift (although the water-table is only 4 ft below the sidewalk) and a Mercalli 8 earthquake. Normal working load is about 35 tons per pile.

The foundation over the piles is a grid of reinforced concrete girders, some as large as 13 ft deep and 4 ft wide and reinforced with 110 bars 1½ in. in diameter. The building load was made to correspond with the resultant of the pile distribution and the center of gravity of the foundation area.

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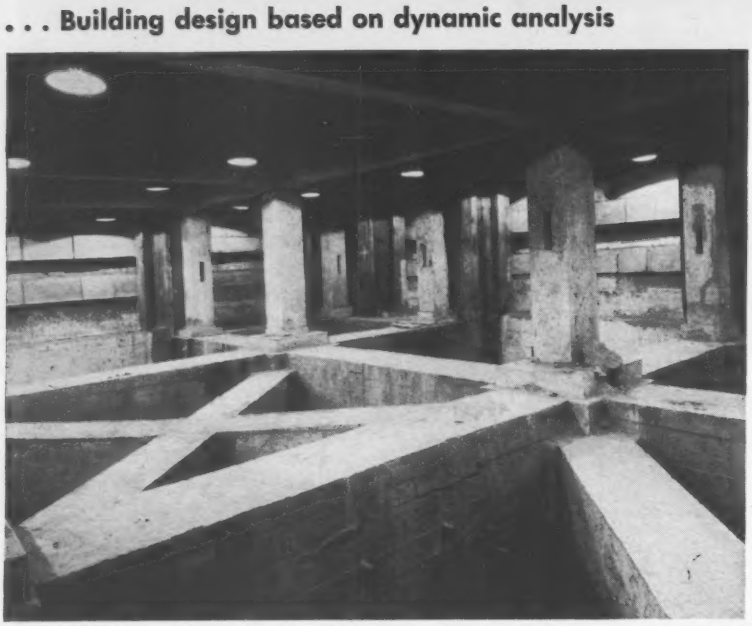
. . . Building design based on dynamic analysis



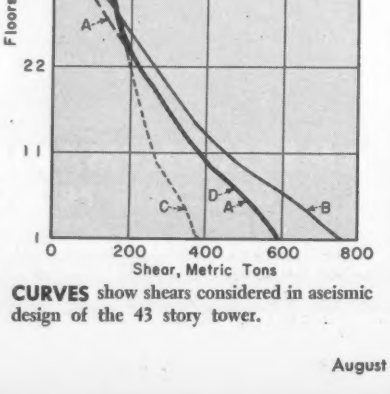
FOUNDATION of the Latino Americana tower, designed partly as a floating box and partly pile-supported, consists of concrete girders atop a base slab to make piles act as a unit.

ance to earthquake forces, all the 3½ in. thick concrete slab floors in the superstructure are connected to the steel frame with steel channel shear connectors. The slabs themselves are reinforced top and bottom in two directions and also with bars crossing the slabs on the diagonals and welded to steel hoops around the columns to resist horizontal torsion.

In taking earthquakes into account, the designers estimated that since Mexico City is built over deep lacustrine clay deposits, the period of vibration for strong quakes could be between 1.5 and 2 sec, giving a ground velocity of the order of 8 cm per sec for a Mercalli 7 earthquake and about twice that for the maximum earthquake that might be expected. After preliminary studies, it was concluded that a dynamic analysis of the building should be made rather than an analysis based on a static lateral loading using a 2.5% shear coefficient, as prescribed by the local building code. The code specifies that "the horizontal force at any elevation may be computed by the product of this shear coefficient by the total dead and reduced live load applied to the structure above the elevation."

Messrs. Zeebaert and Newmark state in their paper: "In the preliminary design of the building, the first estimate of the seismic shears for the design was made on the basis of a uniform seismic coefficient of 5%. . . . Since previous buildings had succesfully withstood earthquakes and were designed for shears corresponding to a 2.5% uniform seismic coefficient, it was felt that owing to the increased height of the building the shearing stresses might be increased roughly in proportion to the height (nearly double that of the city's next highest at the time).

"The base shear was based on preliminary estimates of the weight of the building. The building at that time was to be only 40 stories in height. A rough preliminary design of the building was made, and fabrication of the steel was begun. However, at this time it was decided to add three stories to the structure as well as a television antenna. The increase in height and weight of the tower made it necessary to consider the design of the building again. It was at this stage of the problem that the first dynamic analyses were made.



CURVES show shears considered in aseismic design of the 43 story tower.

"The results of the various bases for the design of the building are shown in the accompanying graph. In this figure, the curve marked A is the shearing capacity of the various stories for the original 40-story building. The curve marked B shows the shears computed on the basis of seismic coefficient applied uniformly, of 5%, considering the same structure as A but with the increased height and taking into account the weight of the television tower. The curve marked C is the result of the dynamic analysis based on the most probable dynamic shears, for a base shear coefficient of 2.5%.

"It can be seen by comparisons of Curves A, B and C that the upper part of the building would be overstressed and the lower part understressed, under dynamic conditions. The shearing strength for the final design of the building is shown by curve D. Only the upper part of the building was strengthened, from the 28th floor to the top. This strengthening was done so as to provide the resistance indicated by the requirements of the dynamic analysis, with a slightly greater resistance provided in the region just below the television tower.

"Because the steel was already fabricated, the building has an increased strength below the 28th floor, compared with the indicated design values from the dynamic analysis. The final strength of the building, shown by Curve D, is the same as that indicated by Curve A below floor 28.

"It is therefore apparent that the structure above the 28th floor is actually designed for a dynamic shearing condition corresponding to a base shear of 2.5% of the total weight of the building.

"However, the lower part of the building is actually designed for a shear coefficient of approximately 4%.

"The effective shear coefficient for the base of the tower is about 19%, for the 41st story 14%, for the 39th story 10.5%, for the 35th story 7%, for the 27th story slightly more than 4%. For the upper part of the structure, these shears are at least 20% to 75% greater than those required by the Uniform Building Code, and somewhat greater even than this factor in relation to the provisions of the joint committee (Transactions, ASCE, Vol. 117, 1952). For the lower part of the building the design is conservative by any standards, the base shear being about twice that specified by the joint committee code."

The designers calculated that the base shear for a maximum velocity of the ground of 8 cm per sec is 207 metric tons, and for a maximum ground veloc-

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. . . Mexico's 43 story tower

ity of 16 cm per sec, 413 metric tons. They therefore stated that: "It appears that the structure is adequately safe for the maximum probable earthquake in Mexico City and has a factor of safety of about two for the maximum earthquake which has occurred in the period from 1900 to 1946, based on working stresses. The actual factor of safety is, of course, considerably greater."

In the July 28 temblor the shears in metric tons were computed to be as follows:

	Relatives Movement		
	1st-2nd floor	25th-26th floor	39-40th floor
Deflection—1 in.	2¼	2¾	1¾
Actual shear	238	123	42
Design shear	381	189	93
Ratio-action/design	0.62	0.65	0.51

Dividing the base shears, 238 tons, by the total dead load plus 20% of the live load, 15,228 tons, yields a seismic coefficient of 1.6%.

The partitions were undamaged because they were anchored to the floors but the tops were connected to the upper slabs with flexible hangers. The glass windows remained uncracked because the ordinary size panes, 4½ x 6 ft, had ½ in. clearance in their frames, and the big first story windows had 2½ in. clearance. Vertically pivoted windows had extra large pivots to prevent them from coming out when the frame was distorted.

• **Factors affecting behavior**—In evaluating the performance of the 43 story tower, several important design details should be borne in mind:

1. The deep, pile-supported foundation was effective in resisting overturning.

2. Columns are closely spaced, only 20 ft apart.

3. Moment connections are heavy. Made with split wide-flange beams, some are so large they could not be placed against the column webs but had to be attached to the edges of the column flanges. From the 28th floor up, the girders were reinforced by welding to the bottom short lengths of steel beams, forming haunches at both ends. All other connections are riveted.

4. The building gets no help in resisting lateral forces from its exterior walls or partitions. As mentioned previously, the partitions are free to move at the top. The facade, cantilevered about 5 ft beyond the outer columns, consists of continuous glass windows, with no mullions, 2 ft high, blue structural glass panels below the windows and 30 in. high aluminum panels above. The backup is a 3 in. thick concrete wall projecting 30 in. above and below the floor.

Adolfo Zeevaert is chief engineer for the owner, and Eduardo Espinosa, chief designer.

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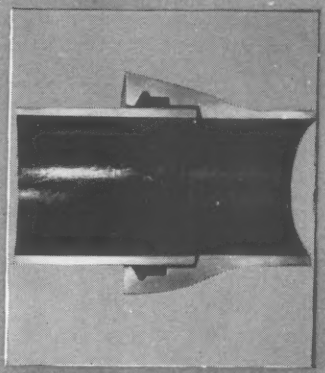
Assembly is simple. First, the joint is wiped clean.

Second step — insert gasket as shown into groove in bell.

Third — apply thin film of special lubricant to the gasket.

Next—push home the spigot, first centering plain end in bell.

No bell holes are required. Installation is very rapid.



Result—a safe, economical joint with a tight, permanent seal.

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The Underwriters' Laboratories, after testing the joint, have approved its use for water working pressures up to 350 psi. CLOW BELL-TITE pipe barrel meets all quality provisions and physical requirements of all applicable ASA, AWWA, and/or Federal Specifications for cast iron pipe.

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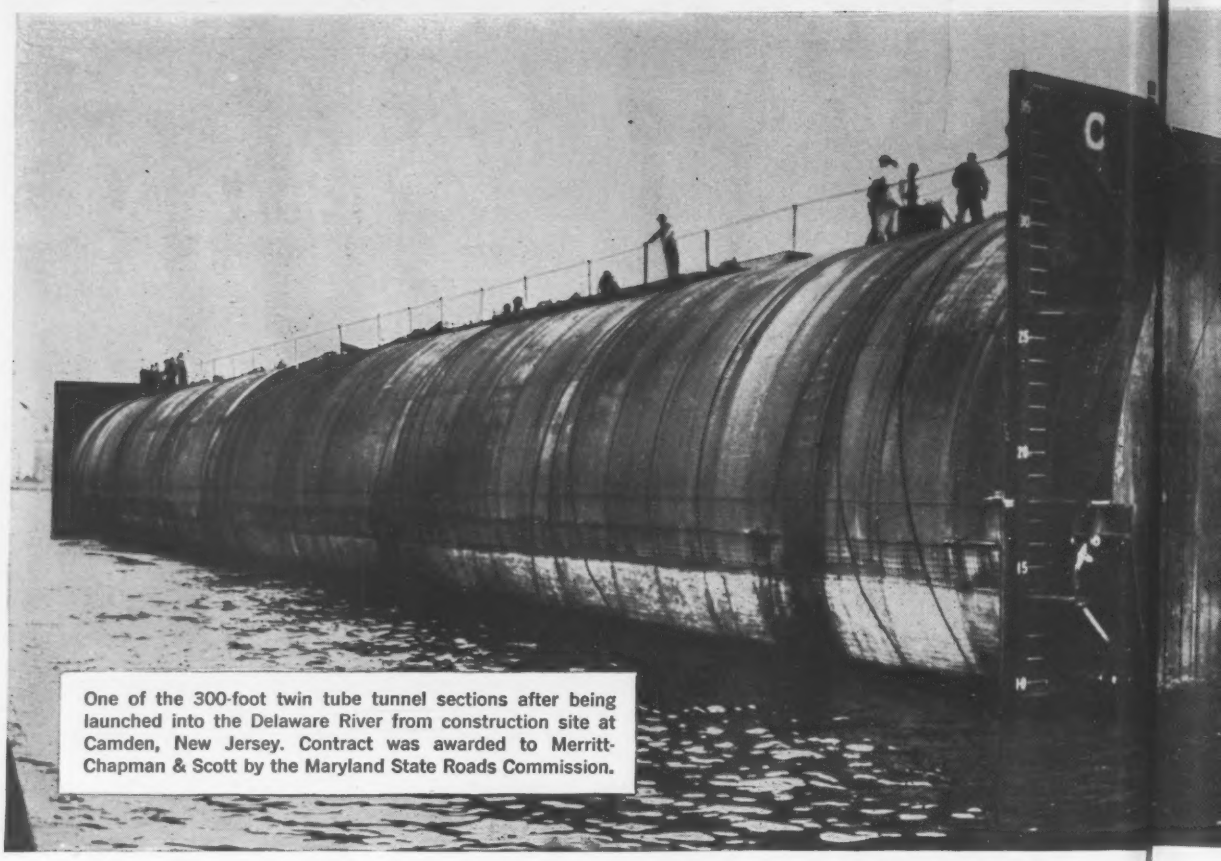

One of the 300-foot twin tube tunnel sections after being launched into the Delaware River from construction site at Camden, New Jersey. Contract was awarded to Merritt-Chapman & Scott by the Maryland State Roads Commission.

Gulf Products help avoid delays on

Here's a 6300-foot tunnel that was floated into position! It's a twin tube tunnel that will carry four lanes of traffic under Baltimore harbor, linking route U.S. 1 on the south with U.S. 40 on the north. Merritt-Chapman & Scott are the contractors on this 30 million dollar job.

The steel core of the trench-type tunnel is made up of 21 twin tube sections, each 300 feet long and lined with concrete. The sections are fabricated ashore, floated into position, sunk in a dredged trench and covered with backfill. Then watertight bulkheads are removed and interior work—tiling, lighting, road surfacing—is completed. The tunnel is 103 feet below the surface of the Patapsco River at its deepest point.

The steel tubes were fabricated under subcontract by Bethlehem Steel, Maryland Drydock Company and New York Shipbuilding Corporation, a subsidiary of Merritt-Chapman & Scott. Use of Gulf quality petroleum products on this job enabled the contractors to be sure of prompt deliveries, avoid mechanical delays and keep their

Shape-up basin where sections are fitted with inner ring of concrete and roadway slab prior to being towed to position and sunk into the river bottom.

Southern end of tunnel in position on the river bottom and ready for road surfacing, tiling, and other final interior work.

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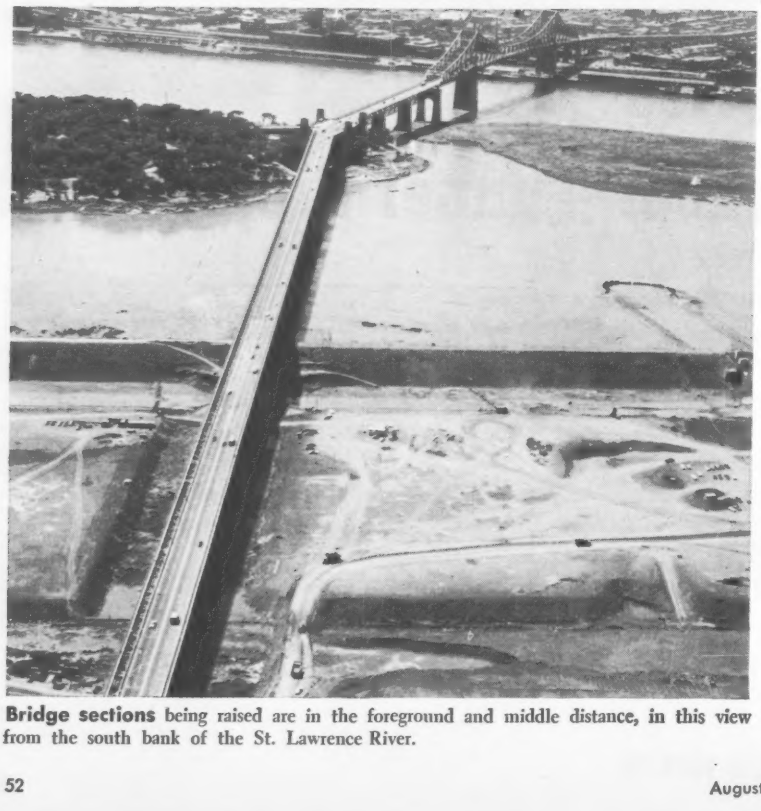
To provide a clearance of 120 ft for sea-going ships in the Seaway canal, the Jacques Cartier Bridge is being raised, using eighteen 500 long-ton and twelve 400 long-ton jacks. In a synchronized operation four points on one pier are raised six inches. By repeating this procedure at the adjacent pier . . .

Jacks Lift Bridge to Provide 80 Feet More Cle



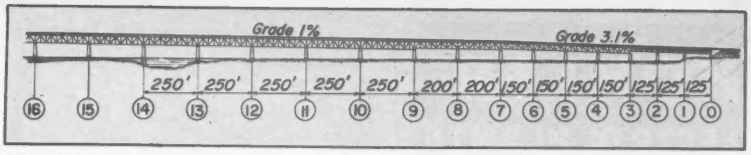
Bridge sections being raised are in the foreground and middle distance, in this view from the south bank of the St. Lawrence River.

If motion pictures were taken over a period of many months of the south end of Montreal's Jacques Cartier Bridge, and then the assembled film clips run together, the bridge would appear to be writhing like a snake.

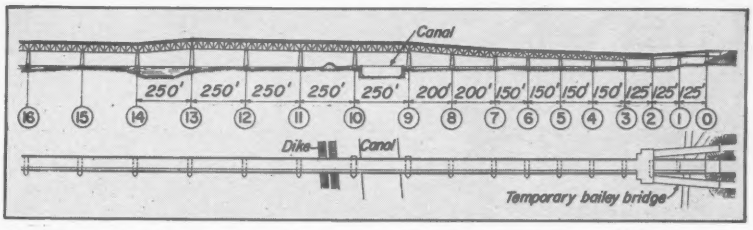
Actually, what's happening is that 14 of the 16 spans on the south end are being jacked upward to provide an additional 80 ft clearance for ships that will soon be using the new St. Lawrence Seaway, which at this point will be in a canal bypassing the Lachine Rapids. First one end of the 14 span section, then the other, then the middle will be jacked up in stages to gain required clearance, but in such a way that traffic can be maintained over the structure at all times.

To cost nearly $7 million, the job, being done by Dominion Bridge Co. of Montreal, is believed to be the largest operation of its kind ever undertaken, and is one of the most complex and spectacular works required for the Seaway.

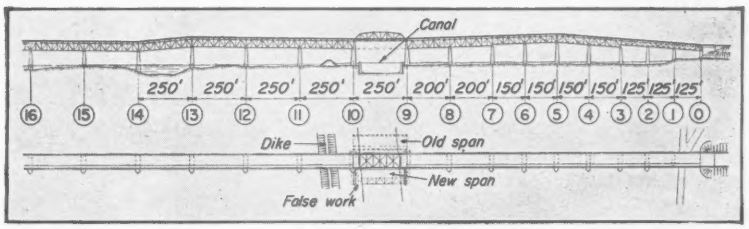
The island city of Montreal dare not permit any of its bridges to be out of service for vehicular traffic at any time—and the Cartier Bridge, handling some 17 million vehicles a year, is a major artery. Yet the half-mile length encompassed in the 16 south approach



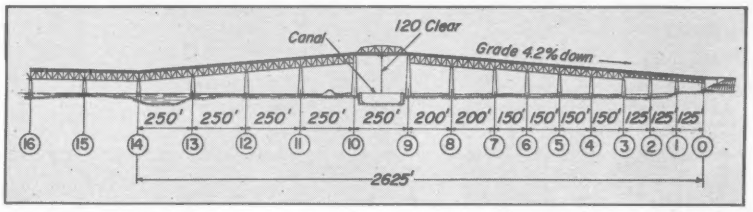
At original elevation—Original southern section of the Jacques Cartier Bridge between St. Helen's Island and the south shore of the St. Lawrence River opposite the City of Montreal. At this stage, temporary Bailey bridges with connecting turnout platforms and temporary access roads are erected while bridge piers have been enlarged to accommodate the added height.



Stage 1—The existing southern abutment and Spans 1 and 2 now have been raised, new abutment is constructed and additional 65 ft plate girder span is in position; also a number of spans at the northern end have been jacked to varying elevations. Span 14 has now reached its final elevation and Span 10 is in a level position, ready for installation of the new through truss span.



Stage 2—New through truss span has been erected on upstream side, using timber falsework from the canal bottom, and slid into position as old deck span is removed to downstream side. A number of spans at the southern end of the project have been jacked to various elevations and the roadway grade up to Pier 5 is now complete.



Final stage—Final elevation of the Jacques Cartier Bridge after the completion of jacking. Throughout the lifting stages, the various spans will be raised 6 in. at a time and the bridge supported on concrete blocks. At intervals of 2 ft., concrete courses will be poured on the piers. This will be repeated until necessary elevations are obtained.

Clearance

spans must be raised to provide a clearance of at least 120 ft above the Seaway canal. To obtain the 80 ft additional clearance, it will be necessary to raise the tenth span (from the south shore) at least 50 ft above its present elevation, and replace the existing 250 ft deck span with a new 1,500 ton through span, and change the existing almost flat grade to a 4.2% grade.

To make this alteration, the bridge will be jacked up, from its initial position to the final road grade profile. The roadway then will slope down to Pier No. 14 (west) at a 3.8% grade. A maximum road grade of 4.2% was decided upon, which means that the roadway over the existing south abutment will be lifted by about 27 ft.

• **Bypass construction**—An elaborate bypass system had to be built, before work could begin on increasing the roadway grade elevation at the south abutment. Traffic was diverted on two lanes of Bailey bridging, which take off on each side of the third span out from the south shore. The turn-off platforms and the Bailey bridging at Span No. 3 had to be supported on a structural steel framework, erected solely for this purpose.

Spans 1 and 2 were then lifted so that the north end of Span No. 2 remained at its present elevation on Pier No. 2 and the south end of Span No. 1 would reach its final elevation at the south abutment. During this stage of jacking, the first pier was increased in height by about 13 ft, and the abutment completed.

Approximately 68 ft south of the south abutment, and on the bridge centerline, meanwhile, a new reinforced concrete abutment was constructed, since the additional fill necessary to carry the approach ramps could not be supported by the existing abutment. A 65 ft steel plate girder deck span was erected between the two abutments.

When this approach system is completed, the main bridge roadway will be opened to traffic and the Bailey bridges and turnoffs removed. The traffic will then be travelling up a 4.2% grade on the fill and on the 65 ft span, then down at about 7.5% to the initial bridge grade at Pier No. 2.

• **Jacking operations**—The main jacking operations are being carried out in stages. The first stage is the bypass and new span construction as well as

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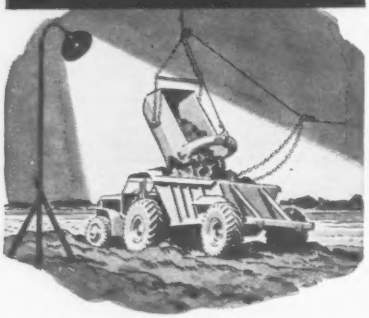

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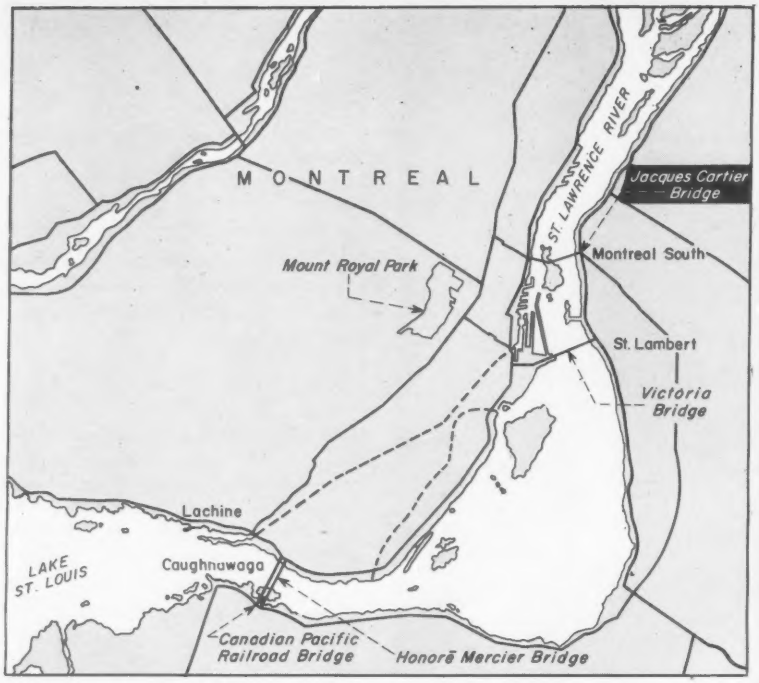
. . . Climbing jacks featured



Jacques Cartier Bridge site is located on map, where the structure is being raised to provide a 120 ft overhead clearance for ships.

the jacking of No. 1 span to the south abutment level, which has already been done.

The second stage is to complete the jacking on Span No. 14, and bring Span No. 10 to a horizontal position approximately 10 ft above its initial elevation, ready for translation of the new through span. Also during the second stage of jacking, a vertical easement curve will be constructed in the roadway of Pier No. 14 to eliminate the sharp change of grade.

The third stage will complete the jacking on Spans No. 1 to No. 5, and the final stage will increase Span No. 10 to its final height giving a 120 ft clearance.

The jacking is being done with eighteen 500 long-ton, and twelve 400 long-ton jacks.

Heavy units, called climbing jacks, are used to replace pier members. The base of each climbing jack consists of three bearing surfaces, two on outer legs and a central one being on a pad on the ram of the hydraulic jack.

Pressure is admitted to the hydraulic jack, thus lifting the bridge and the outer pads of the climbing jack by 6 in. Precast concrete blocks then are placed under the outer pads, so that hydraulic pressure can be released, and the weight thus transferred to the two outside bearing surfaces. A block is then placed under the ram pad, and the operation repeated. In a synchronized operation all four jacking points on one pier will be raised by 6 in., and then a similar operation will be carried out on another pier. When the span over any pier has been raised by 2 ft—four blocks—a course of pier concrete will be cast. When the bridge road grade reaches its final elevation, the climbing jack will be replaced by a precast pier capping block and the original bridge pier member.

• **Erection of new span**—On the upstream side of the bridge and on the canal bed, a massive 140 ft timber falsework—totalling 800,000 board feet—has been constructed.

On the south side of the canal bank and also on the upstream side another timber falsework was erected as a 90 ft tower for a 20 ton stiffleg derrick traveller. Upon the larger falsework, steel-rail topped beams will rest parallel to the bridge piers, one at each end. On this the new through span will be erected. To maintain a single level of pier top during the subsequent jacking operations, the new steel through span must be built on steel legs to bring its pier members down to the elevation of the adjacent deck span pier members. This phase of the work is already under way. After the steel erection work is completed, the roadway slab will be cast on the new span before it

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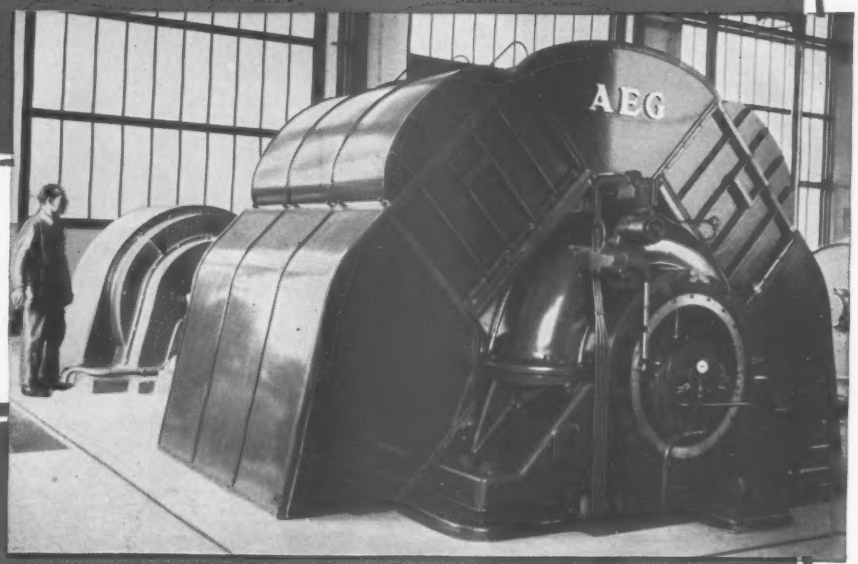

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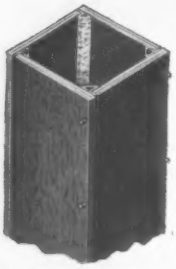

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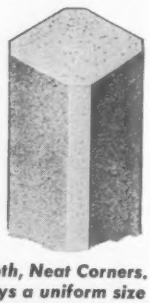

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. . . Piers are thickened

Traveller derrick is used to erect an intermediate falsework adjacent to Pier 9, upon which the new through span will be built.

is moved, so that it is immediately available to traffic.

The moving, or translation, of both the new and old span will be simultaneous—as the deck span is rolled to the downstream side the through span is moved onto the bridge alignment. This operation will be accomplished by repetitive operation of hydraulic packs with a 4 ft runout. Also on the downstream side of the bridge, Bailey bridging will be erected on the falsework at a lower elevation, to carry and protect the numerous conduits and telephone cables being supported across the St. Lawrence River. As the utility lines will have been transferred to the Bailey bridging, the old span can be dismantled and the utility lines can be retransferred to the underside of the newly installed through span. According to the stage four scheduling, Span No. 10 then will be packed with the steel legs attached. The steel legs will remain and finally be embedded in the concrete to be poured for the pier pedestal.

• **Piers strengthened**—Before the structure could be raised, it was first necessary to thicken the piers so that with the added height the taper from the ground to the pier top would be aligned.

This concreting operation was let to the Atlas Construction Co., Ltd., Montreal, for approximately $779,000.

Holes were first drilled into the existing masonry pier walls, into which dowels were set and then wire mesh reinforcing was placed. After the erection of forms was completed around the piers to be thickened—about 18 in. for Piers 1 to 8 and Pier 11—selected aggregates were placed, and grout was forced in. This specialized activity was done under a sub-contract by Intrusion-Prepakt, Ltd., Toronto.

Two piers, 9 and 10, which are immediately adjacent to the canal, were practically doubled in thickness and retaining walls have been constructed to protect them from canal water and passing ships.

The designs being undertaken were prepared by Dr. P. L. Pratley, Montreal consulting engineer who originally designed the Jacques Cartier Bridge which was fabricated and erected in 1929 by Dominion Bridge.

The excavated material, consisting mostly of broken shale, has been used to build up the approach ramps on the south end of the bridge. This has been placed and rolled in the area directly south of the newly erected 65 ft plate girder deck span. With the canal excavations being on the south shore, the fill haul was rather short.

In addition to raising the Jacques Cartier Bridge because of the clearance requirements of the St. Lawrence Seaway Canal, it will be necessary to alter clearance under three other structures spanning the St. Lawrence River and the new canal. Dominion Bridge Co., Ltd., has been contracted to build two independently operated vertical lift spans to carry the Canadian National Railway and vehicular traffic over the St. Lambert Lock, also two vertical lift bridges to carry the Canadian Pacific Railroad over the Seaway canal.

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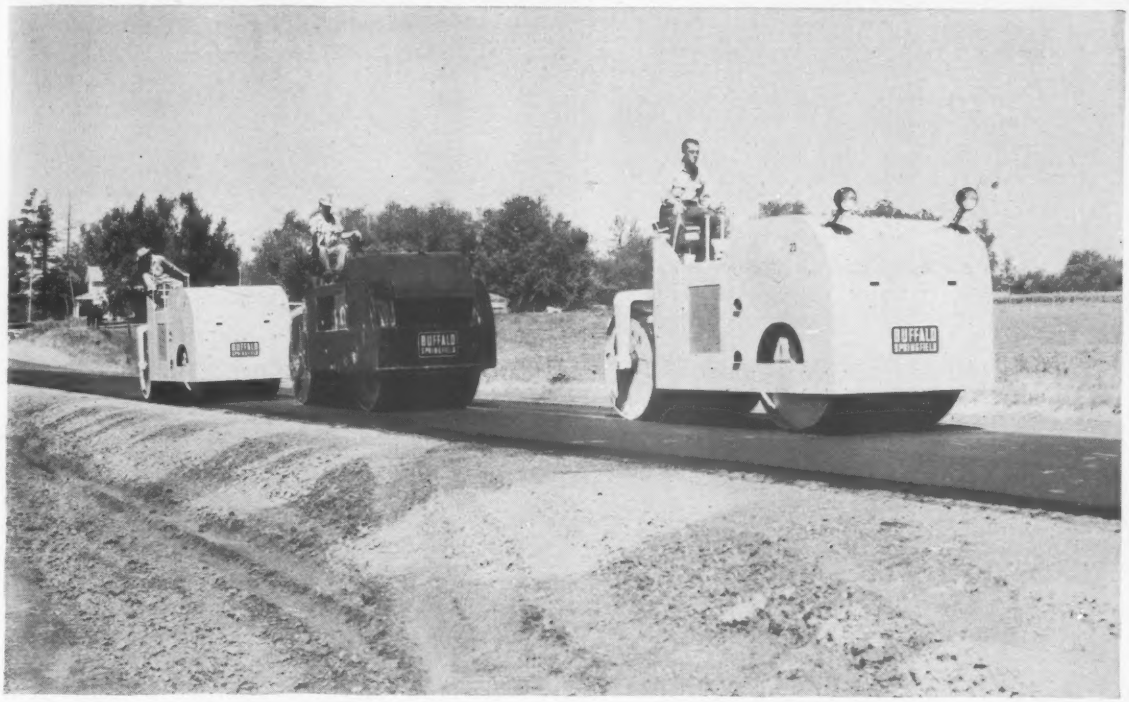

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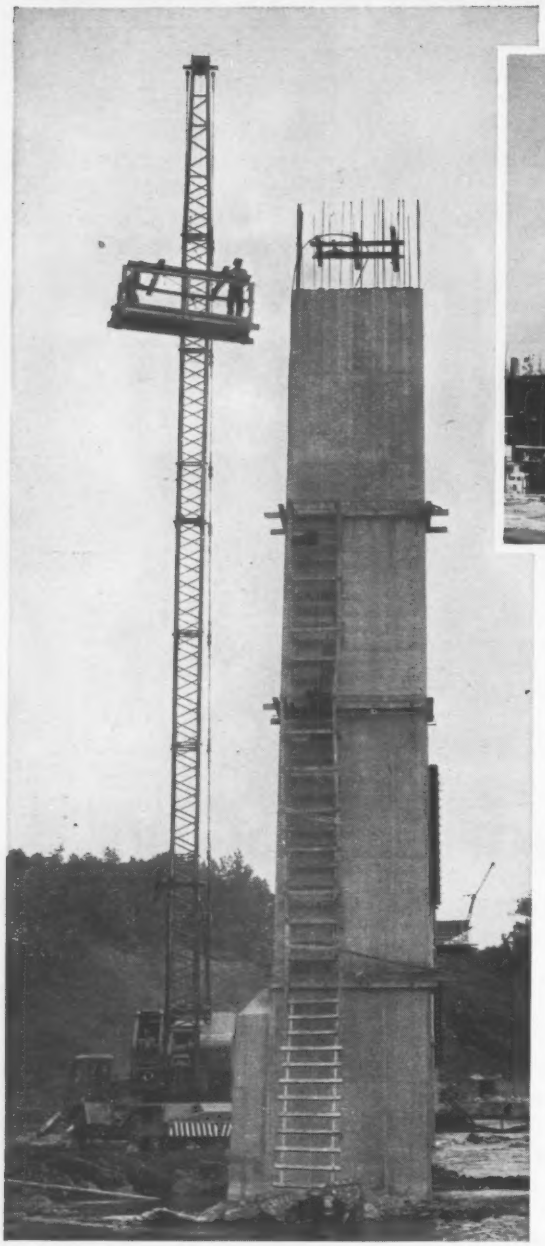

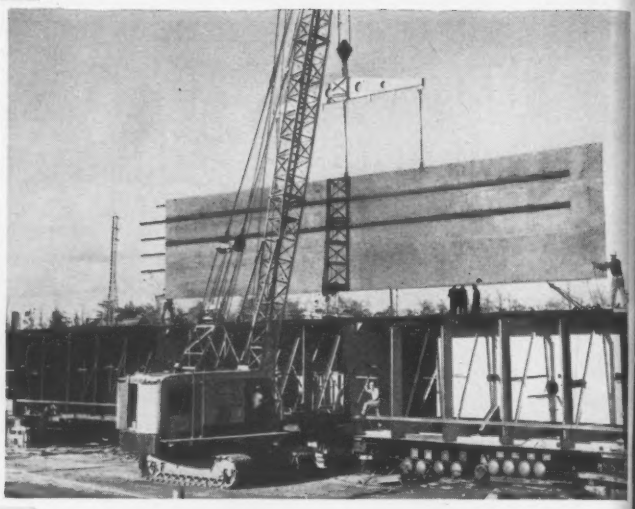

Barge-builder — Large-section steel side-plates have to be hoisted and spotted in position for barge construction at this ship yard (above). It's an easy lift for the Koehring 605 crane. It has the power, strength and stability to safely lift up to 36 tons (on 50-foot boom). When extra reach is needed, the big 605 handles up to 110 feet of main boom — or 130-foot boom and jib.

A long way up — Building reinforced concrete piers for highway bridge, men and materials are hoisted to the top by a Koehring 305 truck crane, equipped with 90-foot boom. But that's not the limit of its reach. Truck-mounted 305 raises up to 100 feet of main boom, or 130-foot boom and jib with low A-frame! Butt-connected boom is safe, solid. Inserts are easily changed, only 2 bolts per corner. Check its lift capacities in chart.

Here are some figures that will interest you:

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305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? *See Koehring distributor.*

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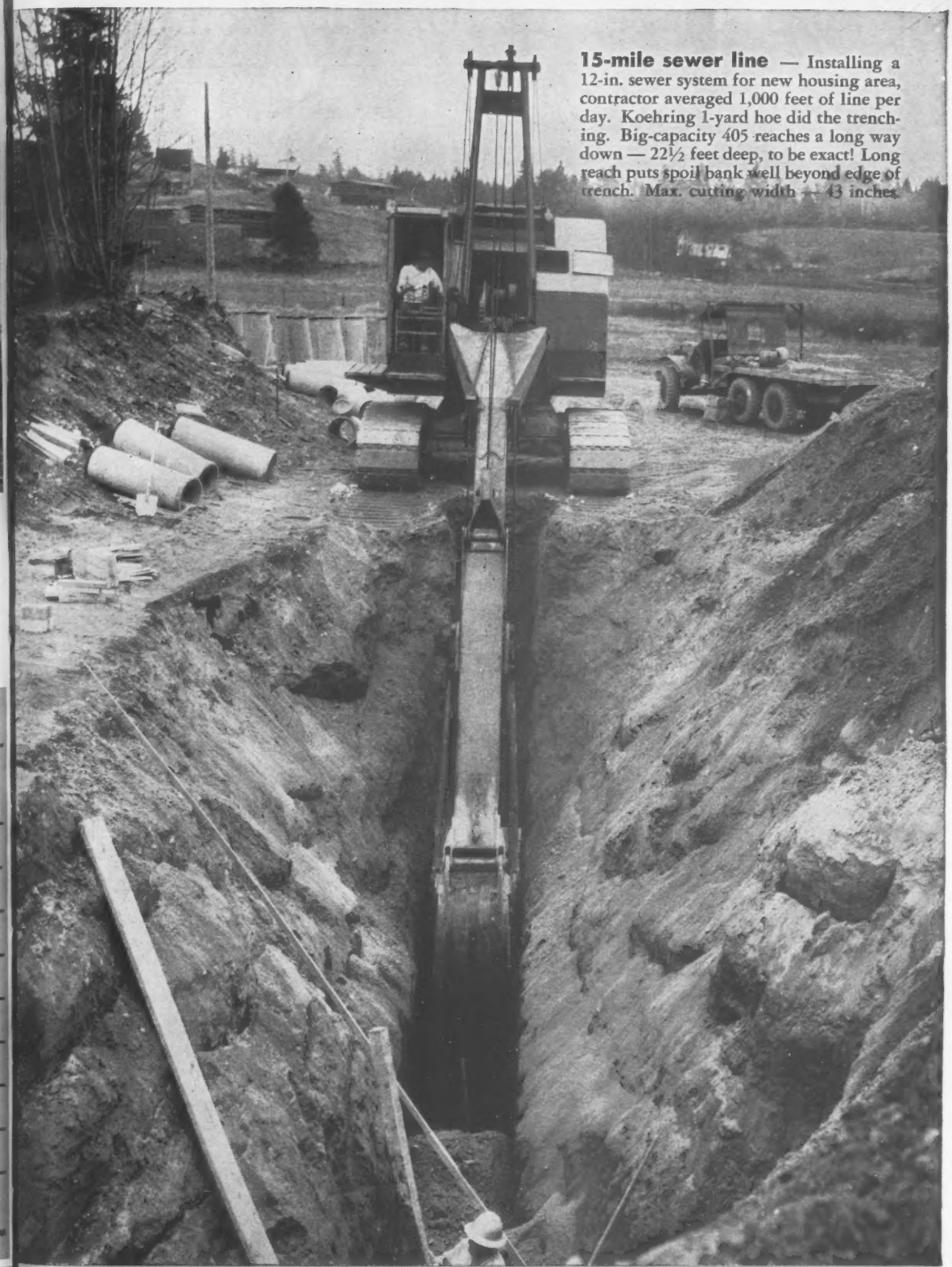

15-mile sewer line — Installing a 12-in. sewer system for new housing area, contractor averaged 1,000 feet of line per day. Koehring 1-yard hoe did the trenching. Big-capacity 405 reaches a long way down — 22½ feet deep, to be exact! Long reach puts spoil bank well beyond edge of trench. Max. cutting width — 43 inches.

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Building Trusses Analyzed by Computer

R. F. Wittenmyer
Associate Director of Research
The Austin Company
Cleveland, Ohio

Electronic computers are being used by The Austin Company to produce allowable load tables for its recently redesigned standard H-section roof trusses. The analyses made to date—for three truss types in spans varying from 50 to 100 ft—would have been particularly tedious when done manually because they involve hundreds of calculations by moment distribution for loads from purlins that are not located at panel points.

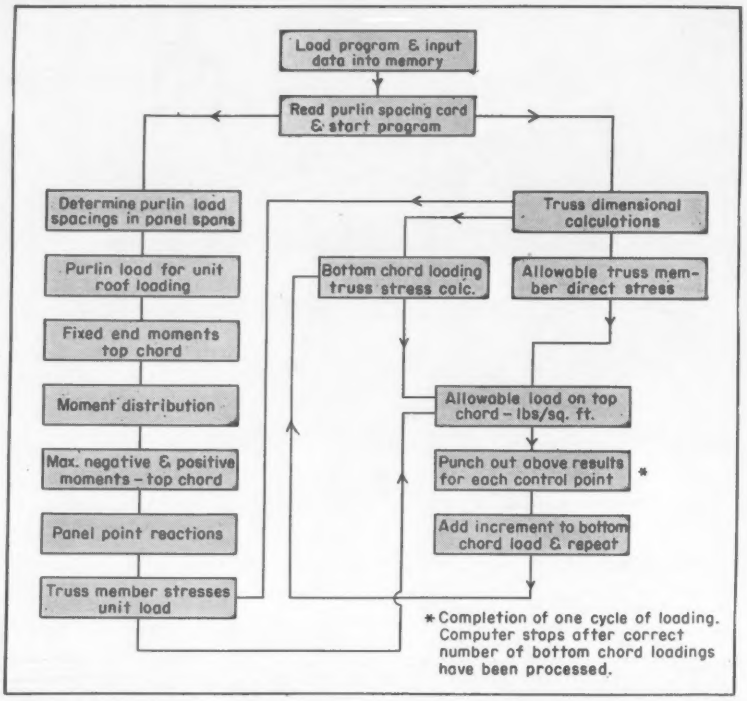
Use of automatic data processing equipment, operated by the manufacturer's service bureau, saved considerable elapsed time and engineering manpower. But in addition, the computer made feasible the use of more exact analytical procedures, in turn permitting the use of almost 100% of allowable truss capacity for any specified design loading.

Working out and debugging of a general computer program, suitable for all three truss types in various lengths with from six to ten panels, required two man-months of an engineer's time. Total data processing time, including input preparation (on punch cards), ran to some nine hours for ten different trusses, each subjected to more than 100 different combinations of purlin spacing and bottom-chord loads. Actual machine time for one truss was about 20 min. (Charges for computer use were made on a time basis.)

Performing this work manually for the complete series of trusses would have required 20 man-months for computation and checking.

Programming for electronic computers is a skilled endeavor, often done by experienced programmers. In this instance, however, because of the intricacies of the engineering analysis and the lack of precedent on a similar problem, it was decided that it would be more desirable to train an engineer in the technicalities of programming than to attempt, in effect, to teach structural engineering to a professional programmer.

Austin's H-section welded roof trusses are of the Pratt type and are composed of wide flange or I-beam structural shapes with their webs lying in the plane of the truss. Chords are continuous with fillet welded web-member connections.


Load program & input data into memory
Read purlin spacing card & start program
Determine purlin load spacings in panel spans
Purlin load for unit roof loading
Fixed end moments top chord
Moment distribution
Max. negative & positive moments – top chord
Panel point reactions
Truss member stresses unit load
Truss dimensional calculations
Bottom chord loading truss stress calc.
Allowable truss member direct stress
Allowable load on top chord – lbs/sq. ft.
Punch out above results for each control point *
Add increment to bottom chord load & repeat
* Completion of one cycle of loading. Computer stops after correct number of bottom chord loadings have been processed.

BLOCK DIAGRAM shows how computer proceeds. Machine produces allowable load tables for Pratt roof trusses varying in length from 50 to 100 ft for purlin loads not at panel points and varying combinations of bottom chord loads. Continuous chord members require computer to go through moment distribution.

• **Truss data**—Each series of trusses is designed for a specific total dead plus live load. But these standard roof trusses must accommodate different purlin spacings and support various purlin loads that are not at panel points. Trusses must also be able to carry bottom-chord loads in various patterns and magnitudes from cranes, conveyors, piping, heating and air-conditioning equipment, etc.

Therefore, with or without electronic data processing, it was necessary to develop tables indicating the allowable loading for each standard truss, taking into account variable top and bottom-chord loading patterns.

Truss types are parallel-chord, single-pitch and double-pitch.

• **Computer program**—For each truss of each type, the computer is given dimensional data, allowable stresses and the various purlin spacings and top and bottom-chord loadings. As indicated in the block diagram, the machine computes for a unit roof load in psf the purlin loads and their relative position with respect to the top-chord panel points, fixed-end moments of the chord for each panel, actual end moments and shears by moment distribution, adds the shears to get the panel-point loadings. Then, the computer makes a complete static analysis of the truss, working from stored properties of the structural sections and computing l/r ratios and corresponding allowable compressive stresses as needed. The computer is programmed for similar steps for the bottom-chord loadings. Finally, allowable stresses are divided by unit-load stresses in the machine to produce allowable loads.

The program consists of 460 steps, or instructions. For each truss investigated, there were 60 ten-digit numbers, so-called "words," of variable input data and 18 words of constants. Forty-nine words giving allowable load in psf for each control point—member or joint at which allowable stress is first reached—were punched out for each loading condition.

Edward H. Strand, senior structural engineer in the Research Division of The Austin Company, set up, wrote and debugged the program and interpreted the results, under the general direction of the author and A. T. Waidelich, vice president manager of engineering and research. Computation was performed by an IBM 650 computer, rented from the IBM Service Bureau Corp.

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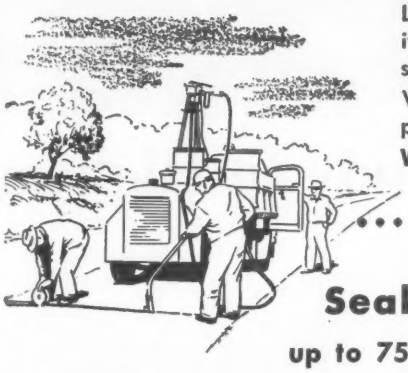

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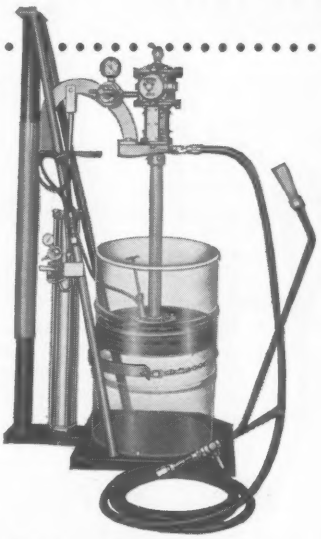

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Buffalo Roads: A Case Study In Highway Inte

Nearly 28 years ago an Erie County (N. Y.) highway engineer named George Diehl publicly stated that "Municipal boundaries no longer exist for motor traffic."

In a day when there were less than 23.5 million cars in the United States, and when the best roads were not particularly good, Diehl's plea for integration of local and long distance roads was given little consideration.

Today, however, probably nowhere is there greater proof of the truth of that remark than in Mr. Diehl's own city of Buffalo where a complex system of arterial highways is being tied to three separate sections of the New York State Thruway, to several important state highways and to a proposed belt expressway to be built as part of the interstate highway system.

Situated on the Niagara River and the northeastern tip of Lake Erie, Buffalo has been important since colonial times. Completion in 1825 of the Erie Canal and the subsequent development of railroads increased the city's importance by making it the transshipment point for the products of the West and the North.

With the development of the grain states and the discovery of iron ore at the western end of the Great Lakes, Buffalo's location made it a natural processing center for the raw materials which could be carried no further east by lake steamers. As a result, the city today processes more wheat than any other city in the country, and the conversion of iron ore is it's most important industry. Bethlehem's Lackawanna plant is the third largest steel mill in the U. S. and in tonnage output, Buffalo stands sixth in the nation.

The city itself boasts a population of just under 600,000 and its suburbs push the figure to more than a million. Yet in an east-west direction, there is only one street (Delavan) that runs from one side of the city to the other—and in it's 5 mile length there are more than 60 intersections.

For through traffic in other directions the condition is almost as bad. Fortunately, the main streets are unusually wide (several exceed 150 ft) and fairly straight. But in a city that depends on surface transportation, traffic lights and intersections are a problem for both local and through traffic.

The need for both arterial and through highways has long been recognized by state, county and city highway officials, but until recently the common cry "no money" has been a deterring factor. However, under the impetus of the Ontario Thruway to the east, completed in 1954, and current construction of the Erie Thruway south to the Pennsylvania line, and the Niagara Thruway across the city and north to Niagara Falls, the arterial program is gaining speed.

Of the 21 miles of arterial highways planned, 4.5 miles have been completed at a cost of $18 million, and another two miles are under construction at a cost of $10 million.

One of the completed projects is the Buffalo Skyway, a four lane high level bridge spanning the Buffalo River adjacent to Lake Erie. This 1.5 mile long $15 million structure clears the river by 100 ft and carries vehicular traffic over as wide a variety of traffic barriers as can be found anywhere. In addition to the river; city streets, main line tracks of the New York Central Railroad, and numerous industrial crossovers make up a few of the installations

Arterial highways are the life lines of any urban area—and they are doubly important in a city like Buffalo, N. Y. (left) which depends entirely on private vehicles and busses for mass transportation of its 600,000 residents and 400,000 suburbanites.

ay Integration

crossed by the new structure. The final two miles of the route now under construction and scheduled for completion in 1959, involves another high level bridge over the Union Ship canal and trackage of three separate railroads.

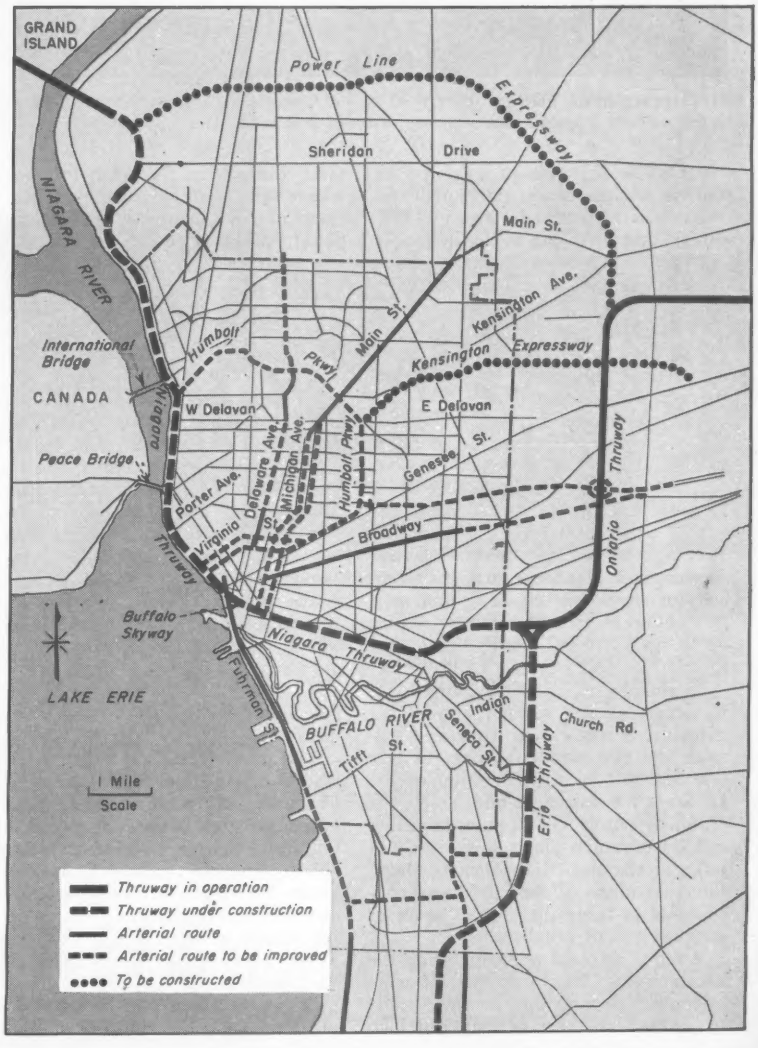
Two more projects, still in the design stage but scheduled for fall lettings, will traverse the northern part of the city to connect the Niagara and Ontario Thruways with each other and with downtown business areas.

One of these projects is the final 3 miles of the 5 mile long Scajaquada Creek Expressway. The road, which will connect with the Thruway at the Niagara River is expected to cost $10 million.

The other project is the 10 mile $25 million Kensington Expressway which will run from the heart of the city to Rte #33 at the Buffalo Airport and which will connect with the Ontario Thruway just east of the city line. This road will have controlled access and divided pavements.

To complete a belt system around Buffalo, the State Highway Department is planning the Power Line Expressway just north of the city line. Several sec-

Solution to the city's traffic problems is plotted on map below. Close cooperation between city planners, state highway department officials and the New York State Thruway Authority is resulting in a complete integration of city streets, state highways, and three sections of the New York Thruway. Numerous interchanges within city limits will make the Niagara section of the Thruway an integral part of the local street system.



. . . Railroads complicate Buffalo roadbuilding

At International Bridge between U. S. and Canada, the Niagara Thruway will take to the water in a bathtub-like structure that will float most of its own weight.

tions of the 9.1 mile highway are already in advance design stages and construction is scheduled to start in 1959. When completed, the $13 million road will link the Ontario Thruway and the Niagara Thruway on a route that completely bypasses the city.

Construction of arterial highways within the city of Buffalo involves all of the usual difficulties of urban road work—and a few unusual ones.

The relocation of dispossessed families is a problem. For the initial two miles of the Kensington Expressway, more than 600 parcels of land must be taken over. Of these, 540 are occupied, principally by one, two and three family dwellings. Since many of the buildings are marginal or sub-marginal, the problems of relocation are both economic and physical. The city is now setting up an agency to assist in finding homes for what may well exceed 5,000 people.

In Buffalo, it is virtually impossible to design a road without considering railroads. Served by 10 trunk line railroads and two switching lines, the city is the second largest rail center in the U. S. It's 5 passenger and 11 freight terminals handle 95,000 trains annually, and its terminals alone have over 600 miles of trackage. It is obvious, therefore that much of the city's road construction is being done over, under or adjacent to rail installations.

Another unusual problem facing the roadbuilders is the inadequacy of some of the city's older storm sewers. Already overloaded, they are incapable of handling the increased velocity of runoff which will result from the paving and slopes of new construction. The Buffalo Sewer Authority, which is responsible for maintaining, operating and improving the sewer system, is co-operative—but very short of funds. A solution to this difficulty is yet to be worked out, but the arterial highway program is definitely under way.

Of equal importance to the motorists of Buffalo is the Niagara Thruway. Being built primarily to carry traffic to Niagara Falls, this section of the New York Thruway will have 15 access ramps to city streets and because of the location of its toll barriers, will provide local traffic with a six lane freeway through most of the city.

The Niagara Thruway starts east of Buffalo at the "Triple Interchange" which is the junction of the three-year-old Ontario Thruway to the north and east and the now-under-construction Erie Thruway south to the Pennsylvania line.

The northern section of the Niagara road is an existing route which starts just north of the city, crosses Grand Island and stops at the Niagara city line. Of the remaining 12 miles, which are almost entirely within Buffalo city limits, 10.5 miles are either completed, or under construction and scheduled to be opened in late 1959 or early 1960. With completion of the Niagara Thruway, Buffalo will be one of the first cities in the country to be served from all directions by a complex of limited access highways.

The price for the city section of the thruway is high—$75 million for construction costs and $25 million for right-of-way—yet it would have been much higher but for a one-in-a-million break.

After initial designs for the road were completed—on a route other than the one now being used—the Lehigh Valley Railroad decided to abandon a four-mile-long spur into the downtown area. The Thruway Authority jumped at the chance to acquire the property even though changing the route involved scrapping part of the preliminary plans. For $6.95 million the authority got 4 miles of well compacted, unencumbered road bed, two passenger stations, a freight station, a warehouse, and several acres of freight and station yards. Any land or facility not needed for the new road is to be sold. Already 110,000 sq ft of land at Scott Street have been sold for $55 million and other surplus properties will be put up for sale in the near future.

Aside from the prospects of a monetary return from the sale of unneeded land, acquisition of the railroad right-of-way has had several other important effects—all of which are good.

Buffalo has one less swath cut through it than it would have if the original route had been used. Between 600 and 1,100 families were spared from losing their homes. A considerable amount of industrial property, which otherwise, would be taken out for road right-of-way, still remains on the city's tax rolls.

Furthermore, because the 200 ft wide railroad right-of-way is for the most part elevated on fill, and because the grades and turns are well within the requirements of the authority, almost full utilization of the existing roadbed is possible. According to authority spokesmen, this will save millions of dollars in construction costs and will cut the construction timetable by more than one year.

Difficulties in constructing the remaining eight city miles of thruway, however, are many.

Almost the entire roadway is elevated, either on structures or fill. In all, the Niagara thruway will have 48 structures, longest of which is the 7,298 ft viaduct that will carry traffic between Chicago and Court Streets. The viaduct will go over 16 city streets, will go under the Buffalo Skyway at the Memorial Auditorium, and will skirt a main line of the New York Central Railroad. At the auditorium, the thruway will be the fourth elevation of an already complex system of criss-crossing roads and railroads.

At another location, the International Bridge, a double track, 400-ft-long swing span over the Niagara River, is

View between the two 2250-ton compressors at Garden State Plaza.

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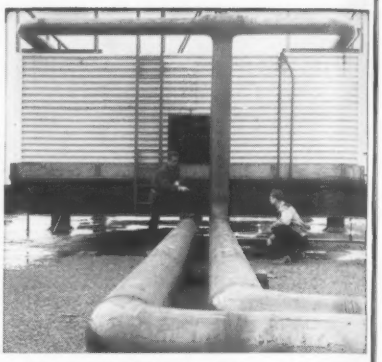

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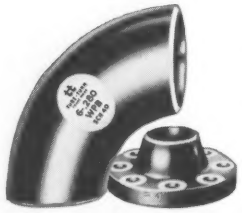

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responsible for one of the most unusual structures on the Thruway—the so-called "Boat Section." The "Boat" is a 1,300 ft depressed section of roadway to be constructed in the Niagara River in such a way that it will actually float the major portion of its own weight.

In locating the thruway, it was decided that the only practical way to get the road across the international tracks, was to run it on the river side of the east abutment of the International Bridge. Because the bridge clears ordinary high water by only 11 ft, the road must dip to an El. −9.00 or 9 ft under the ordinary high water elevation of the river.

To cope with the problem the New York engineering firm of Clarke and Rapuano have come up with several unusual engineering and construction features.

Coming at a 3% grade from the elevated section to the south, the road drops below the extreme high water level about 600 ft from the bridge and emerges 700 ft to the north. As an integral part of the roadway, side walls will raise to El. +5.00, thus creating a bathtub-like structure.

As designed, there will be only enough negative bouyancy in the structure to hold it in place at the highest recorded water level with a modest safety factor. To provide for lower water elevations, however, the structure will be supported by 1,200 12-BP-53 H Beam plies bearing on rock at El. −70.00. At high water, these piles will carry little or no weight—at low water they may carry as much as 45 tons each.

Ballasting of the roadway is being handled in an interesting manner. The pressure-slab will be of concrete varying in thickness from two to seven feet. On top of this, and immediately beneath the 9 in. pavement, will be from one to four ft of earth fill. By using 7,800 cu yd of special fill, the engineers have saved about 5,000 cu yd of concrete (and a substantial amount of money) and have simplified greatly, the grading and banking of the pavement base.

Among the problems incidental to the construction of the "Boat Section," are the relocation of a 7 ft dia sewer now under the north line of the structure, and the diversion of part of navigable Scajaquada Creek. To maintain clearances, the creek mouth must be moved to the elevated section of the road which is 700 ft south of its present location.

The Thruway and Arterial highway work is being done under the direction of E. G. H. Youngmann, who is District Engineer of the New York State Department of Public Works, Buffalo. Edward J. Hylant is Buffalo district engineer for the New York State Thruway Authority.

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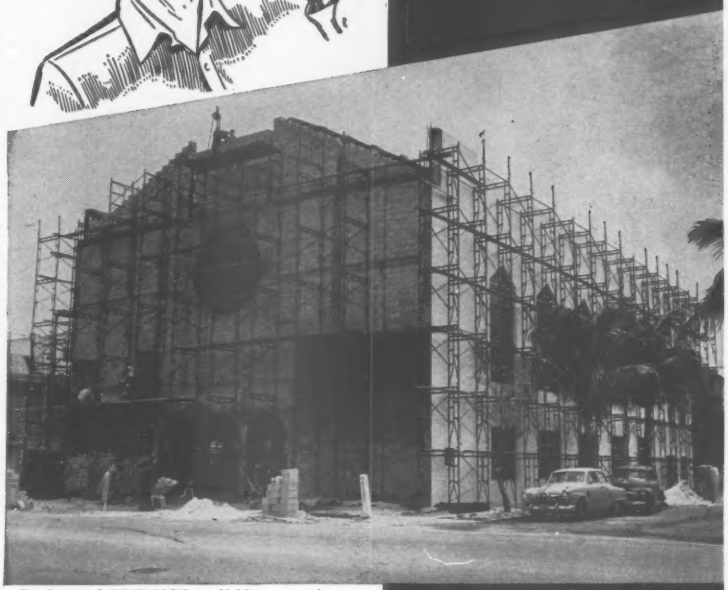

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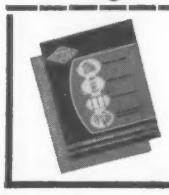

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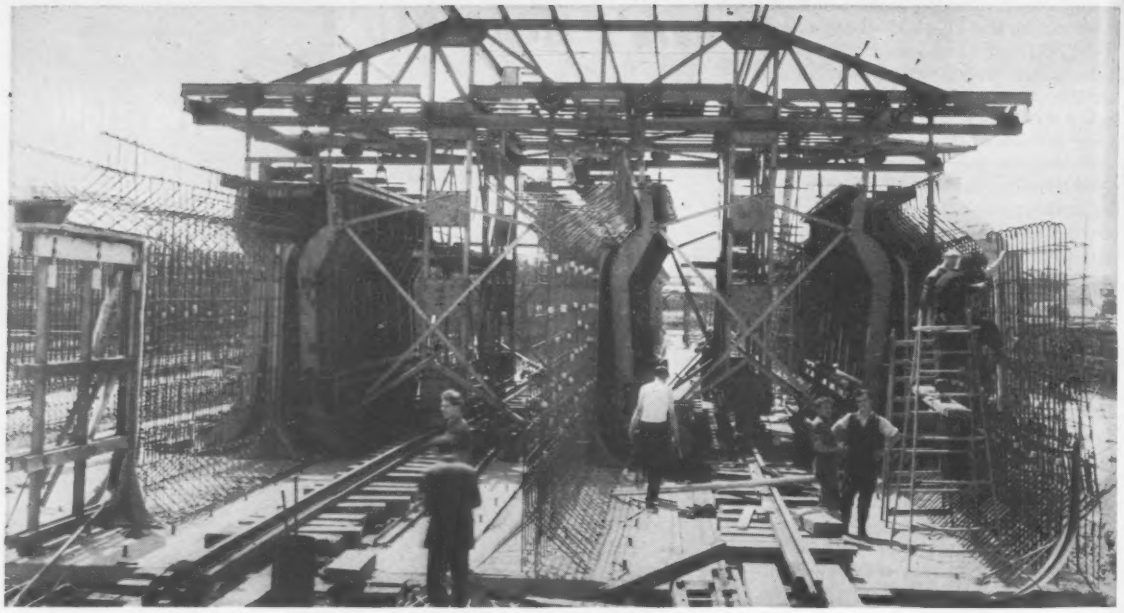


Three 32 ft lengths of 15 ft high wall are placed in one setup as . . .

Forms Hung on Gantry Speed Concreting

Concrete forms suspended and manipulated from rail-mounted gantries are speeding construction of aeration and settling tank walls at the Northern Outfall sewage treatment plant near London, England. A 60 mgd activated sludge plant is being added onto an existing 200 mgd primary works.

The great amount of repetitive work —4 mi of 15 ft high Y-shaped aeration tank wall, 1 mi of 13 ft high circular settling tank wall, ¾ mi of supply and effluent channel wall—justified use of a number of elaborate gantry-form rigs.

There are two gantries for the aeration tanks and one each for the settling tanks and channels. They were designed to permit a 24 hr cycle of concreting, striking, and moving and resetting the rig and form. This is being achieved for all except the aeration tank walls and it is feasible even on these.

• **Aeration tank walls**—The aeration channels cover an area 400 x 850 ft, with walls running in the shorter dimension spaced 17 ft apart. The main gantry used for these walls spans three of them with forms hung as shown in the diagram. The gantry weighs 60 tons and is roofed over. It is propelled on rails by hand winches. Forms are handled by chain and pulley blocks. Gantries and forms are structurally separate to avoid transmitting vibration from the pump employed to deliver concrete.

Each of the six form sections hung from this gantry is an all-welded steel panel 32 ft long and 14 ft 3 in. high. Doors in the lower portion of the panel permit insertion of vibrators into the splayed bottom of the walls. Concrete is introduced from a platform on the gantry.

As concreting progresses into the middle and upper heights of the walls, vibrators with 1¼ in. dia heads are immersed from the top, the small heads required by a 9 in. thickness of wall and a double layer of reinforcing steel.

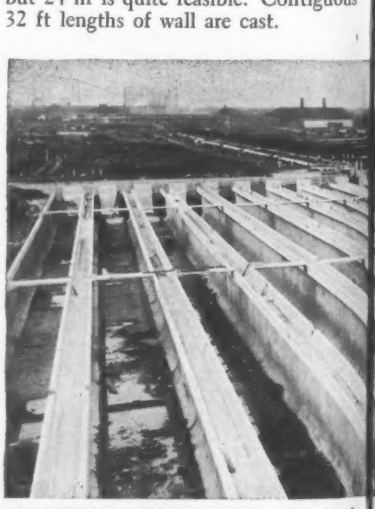
When concrete is near the top of the wall, steel sections that form the trough are closed in place. During the main wall pour, they are open and function as a chute.

The three 32 ft lengths of wall concreted in one setup of a gantry require 65 cu yd. A high early strength concrete was mixed, reaching a cube strength of 1,000 psi in about 16 hr and an average 3,200 psi in seven days. Wall forms can be struck at the 1,000 psi strength. The mix is designed for a seven day crushing strength of 2,200 psi and a 28 day strength of 3,300 psi.

• **Striking**—Suspended from the gantry, the wall forms are tied with one line of bolts on 5 ft centers at about one-third height. The bolts have shoulders which enable them to function as spacers. The steel forms are also tied at the top above the concrete level. They are kept from swinging by X strutting between adjacent pairs. Anchor bolts cast in substructure concrete penetrate the walls and resist upthrust.

As the nuts securing the spacer-ties are loosened, the wall forms free themselves of their own weight and end up hanging several feet from the fresh concrete. In resetting the forms, the central pair of panels is centered first.

The entire concreting cycle has been operated on a 48 hr basis with this rig, but 24 hr is quite feasible. Contiguous 32 ft lengths of wall are cast.



AERATION TANK WALLS, 4 mi of them, were placed with rig shown in head-

A second traveling gantry, of construction similar to the main aeration tank gantry, has been used for the end bays of the aeration tank where the outside walls are of different cross section than interior walls.

• **Circular tanks**—Fifteen circular final settling tanks, each of 110 ft in dia, are being constructed. Walls are 13 ft high, and are cast integral with cantilever brackets. The cantilevers are to support precast sections that form a double overflow weir and collection channel.

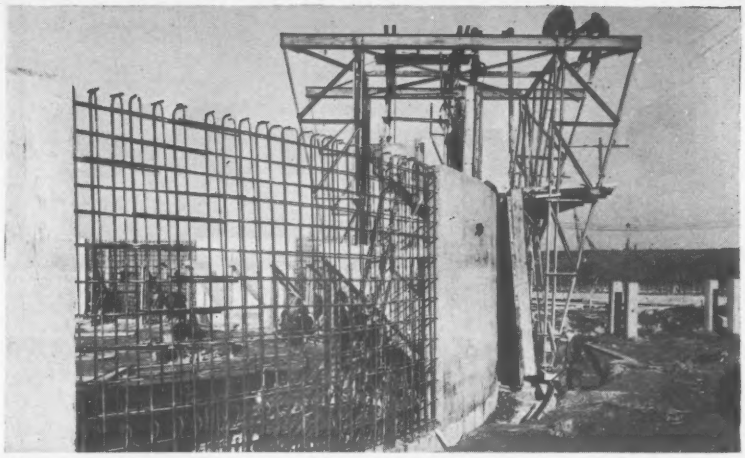
The gantry here is similar to the aeration tank units, except that it is higher to permit lifting of the inner form clear of the protruding cantilevers. Suspended steel side form panels are 20 ft long; forms for the cantilever are handled separately by a hoist on the gantry.

When the gantry has been moved into new position, wall panels are plumbed from previous work and are guided by a protruding wall section placed with the substructure concrete. This "starter" wall also serves as a guide for screeding the tank's bottom.

Settling tank forms are again tied and spaced by the one line of bolts at the center of pressure. Cantilever forms are bolted to the wall forms and remain shored when the latter are struck. A one day cycle has been employed on the settling tank walls.

• **Channel walls**—The same gantry-hanging form arrangement has been utilized for the supply and affluent channel. The former is 600 ft long, latter 1,200 ft in length. They are both 20 ft wide and 10 ft deep, with walls of similar cross section.

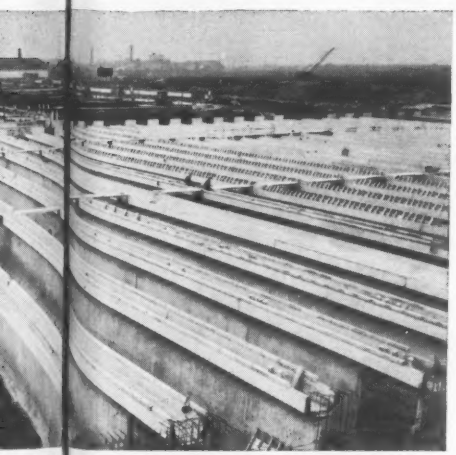
One gantry spans 20 ft, enabling placement of a pair of walls with one setup. Wall panels are 30 ft long; a setup utilizes 18 cu yd of concrete.



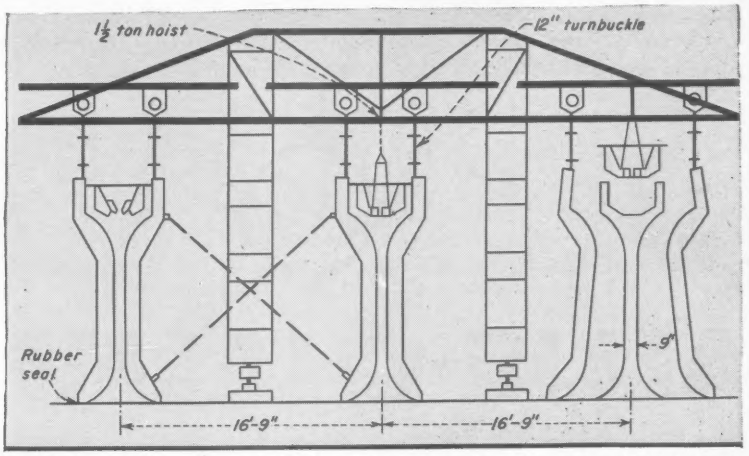
SETTLING TANK WALLS, 13 ft high, were also placed from a rail-mounted gantry-form rig. Concreting cycle for 20 ft lengths was 24 hr.

All concrete on the job—a total of 70,000 cu yd excluding cast piles—has been delivered by concrete pumps from two batching and mixing plants.

The London County Council engineering staff, headed by J. Rawlinson, designed the Northern Outfall sewage plant expansion. Richard Costain, Ltd. has the general contract. C. Parry designed the gantry and form work. Work began late in 1955 and is due for substantial completion next year.

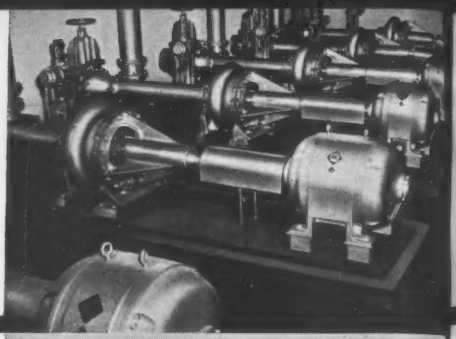


piece. In sketch (right), trough form is open for main wall concrete (left section), trough



form is closed to shape trough (middle) and forms hang clear when stripped (right). Cycle was 48 hr, with 24 hr feasible.

Down in Rio



At the Saturnino de Brito Station, Rio de Janeiro, Brazil: Six Allis-Chalmers 10 x 8 Type PWG pumps ranging in capacity from 1000 to 2700 gpm; driven by Type AW drip-proof squirrel-cage induction motors ranging from 100 to 125 hp.

It's Allis-Chalmers Equipment For Dependable Sewage Disposal

Down in Rio de Janeiro where 3 million people live on a narrow strip of land squeezed in between the mountains and the ocean, there just isn't room for sewage treatment facilities. Instead, Rio has developed a large system of "galleries" or collection points from which waste is collected and discharged into the sea. This system requires a network of small pumping stations between the galleries and the main pumping stations. As a result, Rio has a greater number of sewage pumping stations than any other city in the world — all equipped with Allis-Chalmers pumps, motors and control.

Up in Chicago, where the sewage disposal system has been acclaimed one of the "Seven Modern Engineering Wonders," Allis-Chalmers pumps and motors help in handling more than a billion gallons of sewage a day.

For large jobs or small, Allis-Chalmers offers the widest range of dependable public works equipment — for all the advantages of "one source" responsibility: motors and generators, pumps, compressors, condensers, motor control, transformers, and switchgear.

An Allis-Chalmers team of experts will gladly help you or your consultants plan an efficient expansion or modernization program. Your local A-C representative will arrange the meeting. Call him, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

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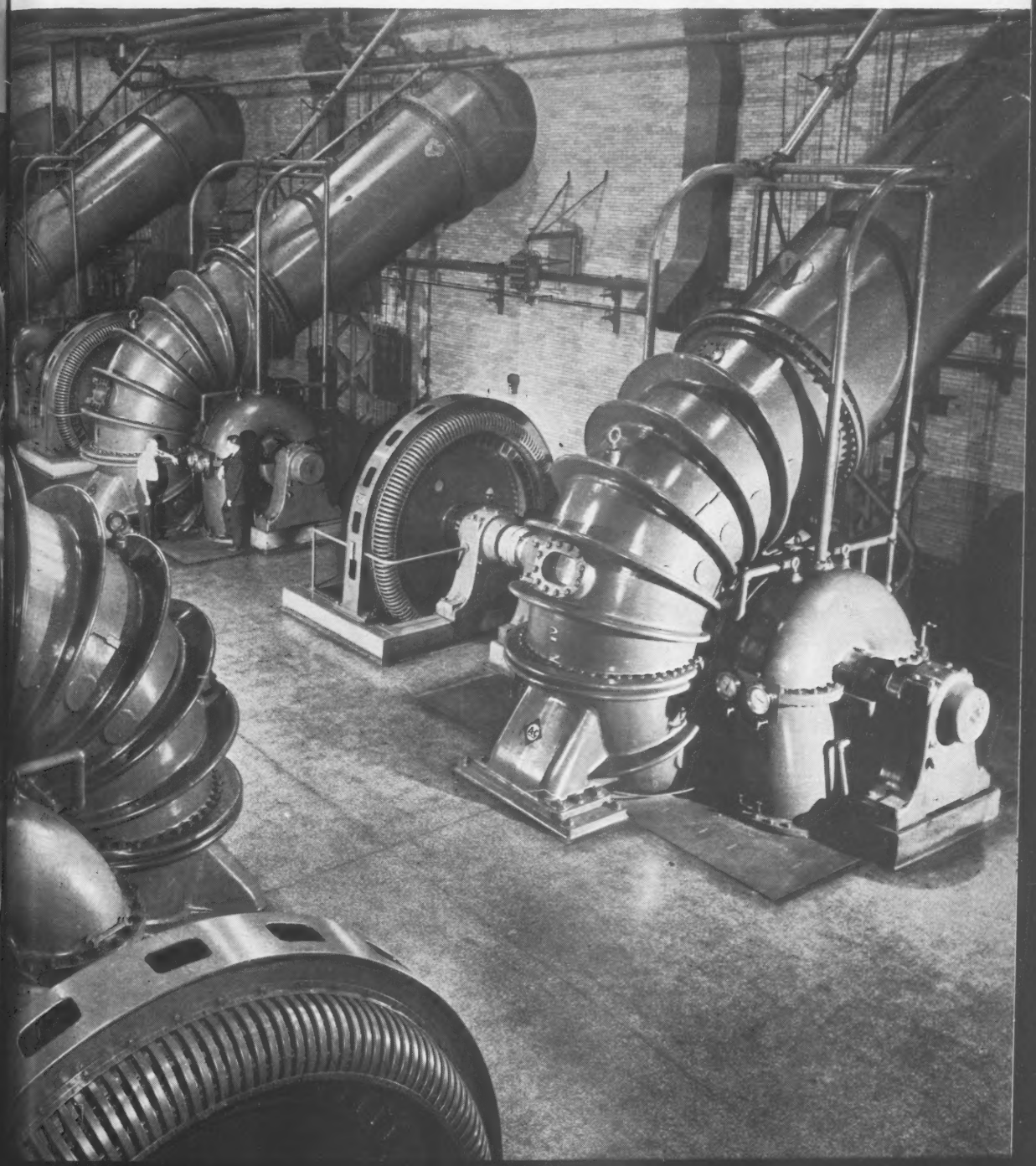
ALLIS-CHALMERS

...Up in Chicago

At the Racine Avenue Station of the Metropolitan Sanitary District of Greater Chicago: Twelve Allis-Chalmers 72-inch Type SP pumps ranging in capacity from 375 to 500 cfs; driven by Allis-Chalmers Type AK synchronous motors ranging from 1000 to 1750 hp.



Penn-Dixie's 20-ton Plymouth Locomotive transports stone and fullers earth from quarry to crusher 8 hours a day, 5 days a week.

"Fuel savings alone amount to over $2600 a year"

Here's real economy in haulage operations: "We like our Plymouth very much . . . it is definitely faster, more efficient than the steam locomotive we used formerly," states B. B. Nall, superintendent of Penn-Dixie Cement Corp., Clinchfield, Georgia, in describing the performance of the company's 20-ton Plymouth Diesel with Torqomotive Drive.

"Over a ¾-mile route from quarry to crusher, our Plymouth Diesel saves us more than $10-per-day in fuel costs alone. Maintenance costs have been exceptionally low with a minimum of down-time in more than three years of continuous operation."

Plymouth's high operating efficiency and low operating cost make hauling, switching and spotting jobs more profitable for large and small companies everywhere. Whether your requirements call for gasoline or Diesel power, mechanical or torque-converter drive, we will gladly send you complete information on a Plymouth built specifically to meet your haulage needs. Send a brief outline of *your operations* to: The Fate-Root-Heath Company, Dept. A-4, Plymouth, Ohio.

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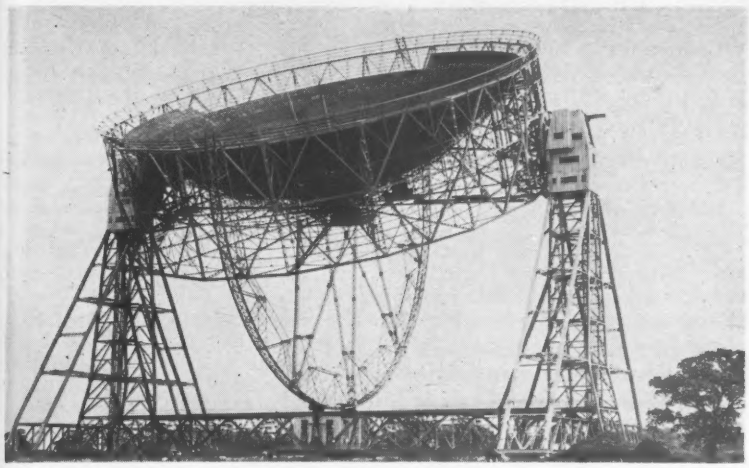
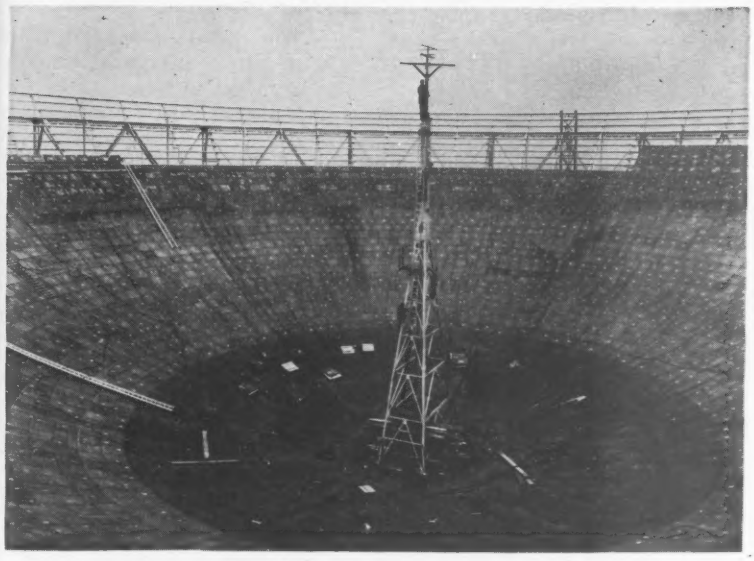


Huge British Radio Telescope . . .



. . . Built to Close Tolerances

A huge radio telescope was completed and put through its paces for the first time near Manchester, England, during the last week of June. Owing to the need for close dimensional tolerances, it is one of the most exacting structures of its size ever built.

The main part of the radio telescope is a 250 ft dia parabolic reflecting surface, 100 ft in depth and weighing 750 tons. With a 62 ft high antenna at its center, it forms the most powerful short-wave receiver ever constructed.

The Jodrell Bank radio telescope, as it is called, will be used to locate and plot celestial sources in space that cannot be seen optically but are powerful emitters of radio waves. Its principal advantage over instruments dependent on visual inspection is that the radio telescope is independent of both cloud and fog and, to some extent, dust. Work can also proceed during daylight hours.

• **Construction features**—The parabolic dish pivots on trunnions carried 165 ft above the ground on two bogie mounted towers. These rotate the bowl in azimuth on rail tracks forming a circle 360 ft in diameter.

To keep maximum permissible deflections at the center of the bowl to ½ in. under a 46 mph wind, the continuous steel-plate reflector is supported around its perimeter on a circular space frame 73 ft in depth and consisting of 16 braced panels. The panels are linked by 16 radial trusses to a central spider beam 11 ft deep. Intermediate secondary ring beams brace these trusses. K-type and diamond-pattern bracing are used in the trusses to provide the high rigidity required of the structure.

To avoid local dishing, the steel reflecting surface was made up of 7,100 flat plates welded together and bolted to 2,000 purlins curved to the paraboloid shape. Bolting allowed a certain degree of profile adjustment of the reflecting surface.

The latticed towers, on which the reflector pivots, are tied at the bottom by a pair of deep radial trusses, which pass through the pivot of the whole installation. The pivot takes all the lateral load of the structure.

Each tower is set on horizontal trusses mounted on six bogies. Two bogies on each tower are motored to move the telescope around the circular track. The other bogies act as stabilizers and develop the necessary reaction to prevent overturning under wind. Rollers on the bogies are not flanged, thus allowing the whole structure to expand radially.

Oscillation of the bowl under high wind loads is damped by a stabilizing ring girder. The ring girder is perpendicular to the trunnion axis and is attached to the underside of the bowl with latticed spokes. Two fixed clusters of braked, pneumatic tired wheels press against the girder face as it passes over the central pivot of the installation to give a variable damping facility.

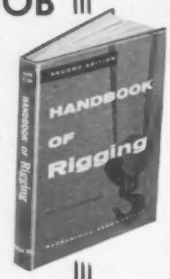
• **Telescope erection**—Tubular steel scaffolding was used extensively in the erection of the parabolic bowl, and at one point, sustained the entire 750 ton weight of the dish.

Construction of the installation started with the assembly outward from the central pivot of the trusses between tower bases. These trusses then were joined to the tower base trusses on which the bogies already were mounted. The latticed towers and trunnion bearings for the dish were then erected.

The central spider beam and the cir-

How to handle any type of RIGGING JOB

- to meet all safety requirements
- in line with best time- and - trouble - saving practices



Meet today's problems in construction and industrial rigging with this *complete* handbook. Here are expert rigging methods and techniques you can use in your everyday maintenance operations, when you transport or handle heavy machinery, when you erect or demolish a smaller structure.

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Packed into the pages of this guide are suggested techniques and methods that can help you perform your tasks with greatest **safety for** all concerned. You are shown how to test scaffold planks, how to inspect supports, how to use hoist signals to prevent accidents, how to safeguard your equipment, and how to give first aid in **case acci**dents do occur. In short, here are modern practices, tested methods and techniques, scores of tips, shortcuts, etc.

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cular space frame were assembled on top of tubular falseworks and precisely located. The first four radial ribs were placed, and the reflector erected fanwise from the central spider beam.

The structure was finally closed without a single length adjustment being necessary.

H. C. Hubbard, structural consultant, designed and supervised construction of the instrument. United Steel Structural Co. supplied, fabricated and erected the steel.

Dr. A. C. B. Lovell, professor of radio astronomy at the University of Manchester, will direct research work in connection with the radio telescope.

Two Building Companies Join Forces In England

John Laing and Son, Ltd., one of Britain's largest construction companies, and H. K. Ferguson Co. of Great Britain, Ltd., will form a separate company to be known as Laing-Ferguson, Ltd.

Representatives of both firms said the move will achieve "a significant and much needed speedup of completion schedules."

The Laing firm has built some of Britain's biggest industrial projects since World War II including twin atomic piles for the plutonium producing plant at West Cumberland, the heavy foundations for the cold reduction mill at the Steel Company of Wales plant, the world's largest knitting wool factory in the north of England, and extensive construction work for Britain's oil refining and petrochemical industries.

Ferguson, a subsidiary of the H. K. Ferguson Co. of America, has designed complete process plants and laboratories for many large industrial firms in Britain, including those where construction work was done by Laing.

Brazil to Call for Bids On Two Mile Rio Tube

The Brazilian government has finally approved plans for a twin-tube vehicular tunnel to connect the Rio de Janeiro federal district with its northern suburb of Niteroi, across the mouth of Guanabara Bay.

Plans for the 6,000 meter, sub-aqueous tunnel were prepared by the French engineering firm Etudes Et Enterprises. Bids for construction and financing will be called within the next 45 days.

Tunnel entrances will be in plazas at the foot of Praca Maua in Rio, and Praca Feliciano Sodre in Niteroi—both of these streets terminating at points of land below sharply-defined ridges that form rocky spines of the two cities. Lowest point under water will be 89 meters, maximum grade in the tunnel will be 4.5%.

The tubes probably will be cut through by the shield method, although some 80% of the route will be through good quality gneiss. Each tube will carry two traffic lanes.

Plans call for a total of three years of construction time, with work being pushed from both sides of the waterway.

About two-thirds of the total estimated cost of $100 million is to be financed by the successful construction firm, the remainder by the State of Rio de Janeiro.

The city and federal district of Rio de Janeiro long ago overflowed into the residential city of Niteroi, northeast of the Guanabara Bay mouth and itself the capital of Rio de Janeiro state. Nietroi's present 174,000 population has access to the national capital, however, only by slow ferries at present—or by circuitous highway routes around the 15 mi wide bay.

Moving Mountains

Rio plans $100 million urban modernization job

Rio de Janeiro hopes to initiate a $100 million city development project that would include the razing of Santo Antonio Mountain in the heart of the city.

Rio's Mayor Negrao de Lima has placed the proposal before representatives of Brown & Root, Inc., Houston. The company is expected to announce its decision in one or two months.

The announcement of Rio's plans followed closely on the heels of a contract between Brazil and Raymond Concrete Pile Co., New York City, to carve out a new capital city in the country's interior to be known as Brasilia (ENR. July 4, p. 23).

According to the terms of the proposal, the 6.7 million cu yd of Santo Antonio Mountain would have to be moved in 90 days.

The materials removed would be dumped into the city's bay to form new land for a proposed highway around the city. The Texas company also would build the highway, some tunnels, cross-town radial throughways and possibly install new sections in the water and sanitary systems.

Brown & Root would be paid in valuable city lands and federal loans as Rio does not have the necessary funds for the project.

The construction firm said the mountain moving compares to the razing of El Litoraneo in Caracas, where 5.3 million cu yd where moved in 54 days.

(*International continued on page 76*)

Florida's Jim Woodruff Dam...

Built 100% of Ideal Cement Concrete

...Creates a New Lake, a New Waterway, and a New Source of Electric Power

The recently completed Jim Woodruff Dam at Chattahoochee, Florida, is a prime example of the way concrete is bringing new development potential and industrial opportunity to the South. It spans the Apalachicola River just below the confluence of the Flint and Chattahoochee Rivers, and provides a new lake and recreation area, a new waterway, and 30,000 kilowatts of new power.

Contractors for this highly useful project were Perini, Walsh, Mills, and Blythe Brothers construction companies, a joint venture sponsored by B. Perini and Sons, Framingham, Massachusetts.

All the cement for this job was manufactured at Ideal's strategically located plant at Mobile, Alabama. Ideal's ability to deliver cement continuously from the big production of the Mobile plant guaranteed maintenance of construction schedules even through periods of the most critical cement shortage.

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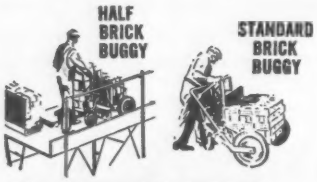
This West SKYTRAK "445" is "on-the-job" at the Dow Chemical Company's new Administration Center, Freeport, Texas, for the Herman L. May Masonry Co., of Houston . . . proving its versatility and ability to cut costs.

Mr. May, owner of the "SKYTRAK" states:

"We are well pleased with the West Equipment — it has worked out much better than anticipated, reducing attending labor by 50% over normal operations. Also, we were able to keep going on many days where ordinary operations would have shut down because of heavy rains. In addition to handling brick and mortar, all scaffolding and planks were moved with the Skytrak Front-end Hydraulic Lift."



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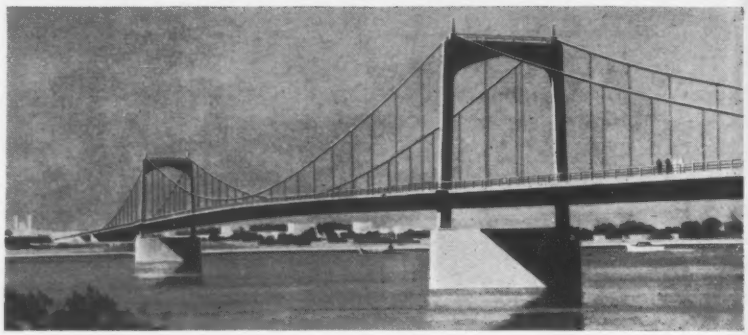


Suspension Span for Tigris at Baghdad

The government of Iraq will span the Tigris River at Bagdad with an 1,100 ft self-anchored suspension bridge designed by an American engineer. The ministry of development selected the above-sketched design and five comparative designs submitted by D. B. Steinman, consulting engineer, New York City.

Stiffened with box girders, the structure will have a main span of 550 ft and two side spans of 275 ft. It will cost about $5 million, including approach roads and a traffic interchange.

Because of its location near the royal palace, this bridge type was chosen principally for appearance. Comparative cost estimates showed it to be in line with other types, however. The self-anchored feature was rendered advisable on account of poor external anchorage conditions.

London Building Will Rise 16 Stories

Work will start in London this fall on one of Britain's tallest office buildings. It will be 16 stories high, rising 170 ft above street level.

The walls of the structure will be almost all glass, enclosing 150,000 sq ft of office space. Underground parking will be provided for about 100 cars.

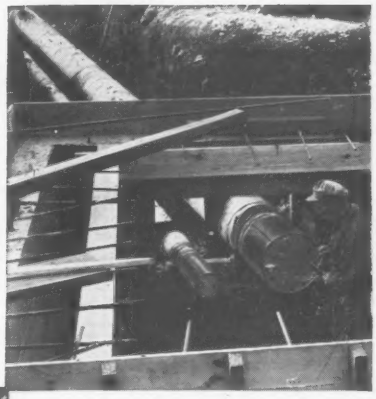
Radiant ceiling panels will heat the building. It will have electronically controlled elevators with a speed of 500 fpm.

Architects are Gollins, Melvin Ward & Partners, in association with Sir Hugh Casson and Neville Condor. Contractors have not been named.

Cost of the project is estimated at $6.5 million.

MR. ENGINEER:
LET'S FACE THE FACTS . . .

How can an underground piping system be watertight when you can't *AIR TEST* it?



Test caps applied to unit ends for air testing full-welded conduit system.

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Ask a RIC-WIL field representative for detailed information regarding Air Test procedure or write for catalog covering recommended field installation details . . . and remember, it pays to do it RIGHT the first time . . .

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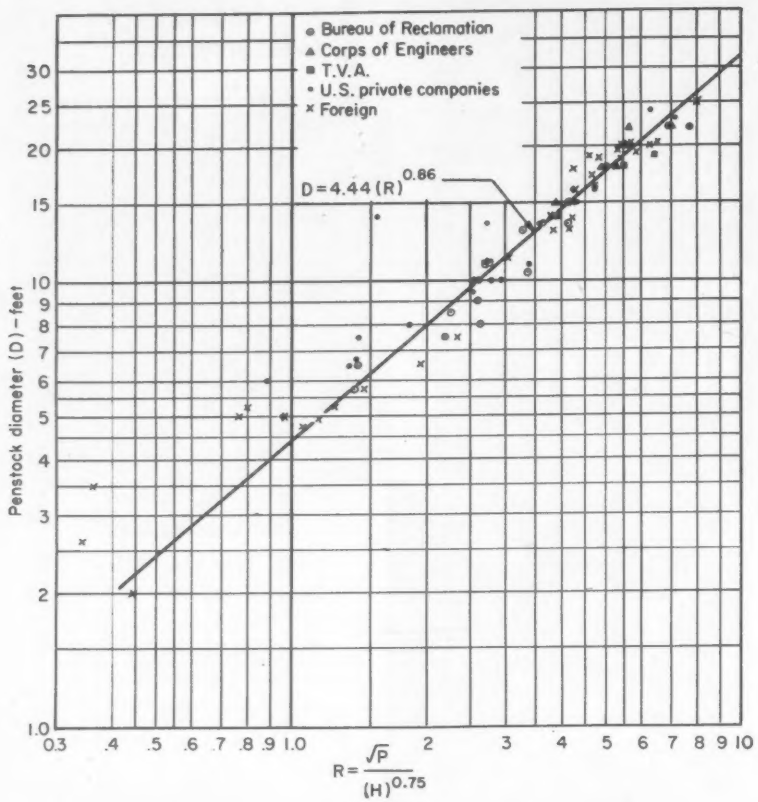


Penstocks Sized Quickly

G. S. Sarkaria
Senior Engineer
International Engineering Co.,
San Francisco, Calif.

A simple empirical formula for determining the most economical penstock diameter for a hydroelectric installation has been developed by the author.

Theoretically, the problem appears quite elementary, requiring only calculation of costs of penstock and auxiliary items and the value of power lost due to friction in the conduit. Actually, it is much more involved since many of the factors are variables and can at best be estimated for average conditions representative over the life of an installation. A formula, based on data for actual installations of various sizes and also consistent with theoretical considerations, should be of great assistance to designers.

Power generated from water flowing through a conduit is a function of velocity of flow, square of internal diameter of conduit, and the available head, expressed as:

$$P = f(V, D^2, H)$$

Since velocity of flow in the penstock is also proportional to square root of the head, the expression becomes:

$$P = f(D^2, H^{3/4})$$

It follows that the economical diameter of a uniform section conduit can be expressed as:

$$D = \phi(P^{1/2} / H^{3/4}) = \phi(R)$$

where, D = dia of penstock in ft; P = rated hp of turbine; H = rated head of turbine in ft; and $R = P^{1/2}/H^{3/4}$.

To evaluate function ϕ in this equation data from 81 existing and proposed installations were examined. Most of the installations have reaction or propeller type turbines, and only seven have impulse wheels. Penstock diameters vary from 25.0 to 2.0 ft. Rated horsepower range is from 156,000 to 365. Rated heads, similarly, cover a very wide range.

To make the empirical formula representative, choice of installations was not limited to those in the U. S. A. or designed by any particular agency. For installations having long variable size penstocks, average diameter of the conduit was tabulated.

Data are presented graphically by plotting the penstock diameter and the corresponding ratio $R = P^{1/2}/H^{3/4}$ to logarithmic scales. The most striking characteristic of this graphical plot is the close agreement shown by data that represents designs covering a wide range of practice as well as size of powerplant and penstocks.

The straight line relation between D and R is represented by equation,

$$\log_e D = 0.86 \log_e R + 1.49$$

$$\text{or, } D = 4.44 (R)^{0.86} = 4.44 \left(\frac{P^{0.43}}{H^{0.65}} \right)$$

This empirical equation is not only simple and easy to use, but for penstocks 10 ft or larger in dia, the results are likely to be within 6 in. of those obtained by detailed cost comparison and economic analysis.

A Look at Penstock Data

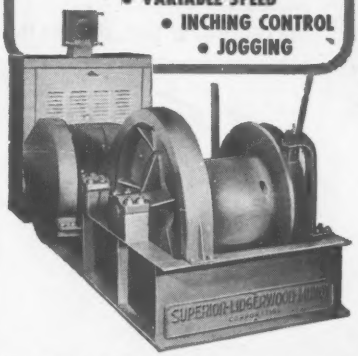
PROJECT	Turbine Rating 000 hp P	Penstock hd-ft H	Penstock dia-ft D	R	Remarks*
REACTION TURBINES					
Brownlee, Idaho	142.0	235	24.00	6.27	PT
Tillery, N. C.	28.8	70	23.00	7.02	E
Parker, Calif.-Ariz.	40.0	77	22.00	7.70	ET
Davis, Ariz.-Nev.	62.2	120	22.00	6.87	ED
Fort Randall, S. Dak.	57.5	112	22.00	6.95	O, T
Buford, Ga.	55.0	145	22.00	5.61	ET
TresMarias, Brazil	91.0	164	20.65	6.56	T
Furnas, Brazil	156.0	282	20.50	5.74	—
Norris, Tenn.	66.0	165	20.00	5.61	ED
Waneta, Canada	120.0	210	20.00	6.29	ED
Kerr, Va.	77.0	189	20.00	5.50	SLT
Center Hill, Tenn.	62.5	160	20.00	5.56	E

PROJECT	Turbine Rating 000 hp P	Penstock hd-ft H	Penstock dia-ft D	R	Remarks*
REACTION TURBINES					
Wolf Creek, Ky	62.5	160	20.00	5.56	E
AdamBeck-2, Canada	105.0	292	19.00	4.60	O
Cherokee, Tenn	41.5	100	19.00	6.44	ED
Genissiat, France	90.0	210	18.85	5.41	ED
Storfinnforsen, Sweden	47.0	159	18.70	4.84	PT
Hiwassee, N. Car	80.0	190	18.00	5.51	ED
Grand Coulee, Wash	150.0	330	18.00	5.02	ED
Table Rock, Mo	73.0	190	18.00	5.28	ED
Bull Shoals, Ark	62.0	190	18.00	4.87	ED
Laforsen, Sweden	21.5	112	17.80	4.24	PT
Seyhan, Turkey	27.5	105	17.20	4.67	T
Bort, France	125.0	315	16.40	4.75	E
Calderwood, Tenn	56.0	213	16.00	4.24	O
Rihand, India	53.0	225	16.00	4.26	ED
Claytor, Va	26.0	110	16.00	4.74	E
Dale Hollow, Tenn	25.0	140	15.00	3.89	E
Shasta, Calif	103.0	330	15.00	4.16	O
Bhakra, India	125.0	370	15.00	4.20	E
Bartletts Ferry, Ga.-Ala	22.0	112	15.00	4.30	O
Konkoure, Fr. Guinea	105.0	377	14.10	3.80	PT
Fontana, Tenn	91.5	330	14.00	3.92	ED
Walters, N. Car	49.0	755	14.00	1.53	—
Canyon Ferry, Mont	23.5	125	13.50	4.13	ED
Hungry Horse, Mont	105.0	400	13.50	3.62	ED
Cheoah, N. Car	33.0	188	13.50	3.61	E
La Grande, Oreg	54.0	378	13.50	2.72	PT
Vigario, Brazil	22.5	118	13.10	4.18	PP
Sakuma, Japan	128.5	413	13.00	3.81	E
Hoover, Ariz.-Nev	115.0	480	13.00	3.29	ET
Hwachon, Korea	37.0	250	11.30	3.05	ED
Ocoee-3, Tenn	33.5	280	11.00	2.68	O
Apalachia, N. Car	53.0	362	11.00	2.76	O
Boysen, Wyo	10.5	96	10.50	3.34	T
Seminoe, Wyo	15.0	171	10.00	2.60	E
Upper Malad, Idaho	12.0	124	10.00	2.95	O
Chandler, Wash	8.5	118	10.00	2.56	O
Alder, Wash	34.5	270	10.00	2.79	ED
Tulloch, Calif	12.0	153	9.50	2.52	ED
Kortes, Wyo	18.5	200	9.00	2.59	ED
Green Mountain, Colo	15.0	203	8.50	2.27	O, T
Beardsley, Calif	14.0	258	8.00	1.83	O, T
Elephant Butte, N. Mex	11.5	140	8.00	2.63	E
Santeelah, N. Car	33.0	660	7.50	1.40	O
Anderson Rach, Idaho	18.5	245	7.50	2.19	ET
Salamonde, Portugal	29.6	394	6.56	1.94	T
Estes, Colo	21.0	482	6.50	1.40	O
Chiblo, Korea	19.4	538	5.25	1.25	O
Tallulah Falls, Ga	13.4	600	5.00	0.96	O
Votna, Norway	60.0	1,278	4.92	1.15	O
Machkund, India	25.0	800	4.75	1.05	O
PROPELLER TURBINES					
Hirakud, India	52.0	87	25.00	8.00	ED
Edea, Fr. Cameroons	14.8	65.6	19.65	5.30	O
Kotla, India	33.5	98	19.25	5.88	O
Itutinga, Brazil	17.0	97	13.75	4.22	O
IMPULSE TURBINES					
Donnells, Calif	74.5	1,151	6.75	1.38	O
San Francisquito, Calif.	21.0	515	6.50	1.34	O
Thorpe, N. Car	30.0	1,150	6.00	0.88	O
Riddes, Switzerland	2–57.0	3,180	5.25	0.80	T
Sassello, Switzerland	2–14.0	1,330	5.00	0.76	PS
Pykara, India	3–10.9	3,080	2.00	0.44	O
Queen's Creek, N. Car	2.2	935	2.00	0.28	O

* *PT=pressure tunnel; E=embedded; ET=embedded in tunnel; ED=embedded in dam; O=open; T=in tunnels; SLT=steel lined tunnel; PS=pressure shaft; PP=pumping plant.*

STANDARD CARPULLERS
with special control

- VARIABLE SPEED
- INCHING CONTROL
- JOGGING



All supplied with the combination of a standard carpuller and AC-DC variable speed drive, the answer to your specialized carpuller requirements.

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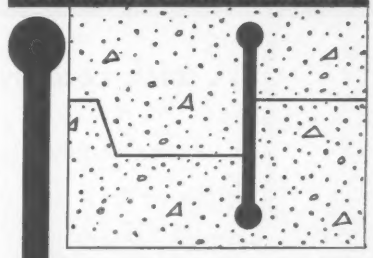
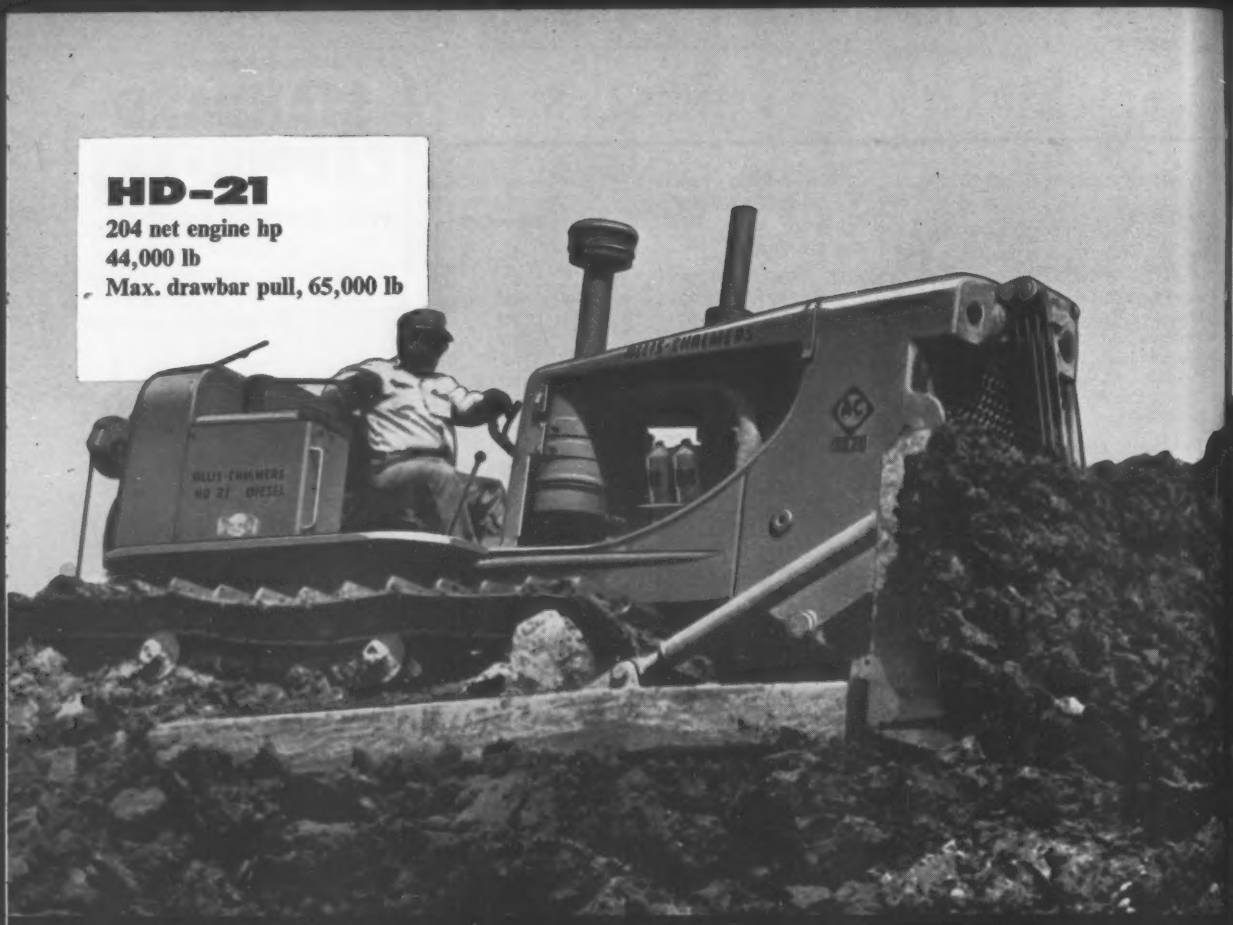
FOR MASONRY CONSTRUCTION JOINTS



Williams Efficiency Waterstops are made from Natural Rubber Stock, and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners—will not tear from shear action. Tensile Test: 3990 lbs.; Elongation Test: 650%. Available in rolls up to 80 feet in length. Field splicing is simple. Williams Waterstops can also be furnished in Neoprene for industrial uses where resistance to oil and other injurious wastes is desirable. These highly effective Waterstops are now in use in hundreds of industrial plants, commercial and public buildings throughout the country.

See Sweet's, or Write for Information.

WILLIAMS
EQUIPMENT and SUPPLY CO.
6001 E. McNichols Rd., Detroit 12, Mich



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. . . with construction's best-proved torque converter tractors
. . . backed by 17 years of on-the-job experience
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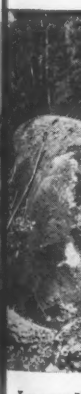
More efficient dozing—Matched engine-converter-transmission team lets operator choose speed range for each job as he starts . . . finish most jobs without further clutching or shifting (except for reverse). With full control at throttle, he can work safely and efficiently regardless of terrain.

Faster on tough scraper jobs—These Allis-Chalmers tractors multiply torque up to four and a half times . . . develop maximum drawbar pull when it's needed most . . . start the load smoothly regardless of material in the cut . . . automatically accelerate to the highest speed that conditions permit.

Nothing like 'em on big loading jobs—The 3-yard HD-16G and 4-yard HD-21G tractor shovels are tough, mobile, flexible enough to pay big dividends on many projects. Operators can crowd surely and steadily . . . without stalling, shifting gears or losing control of the bucket because of slow engine speeds.



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No construction equipment dealer in your area knows torque converter tractors as well as your Allis-Chalmers dealer. See him . . . and get the benefits of 17 years' experience working for you. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Longer life for big equipment—Hydraulic torque converter cushioning reduces shock and vibration on the power train, the entire tractor and its auxiliary equipment—mounted or drawn. That means less downtime, more production time . . . better profit protection on any job!

ALLIS-CHALMERS

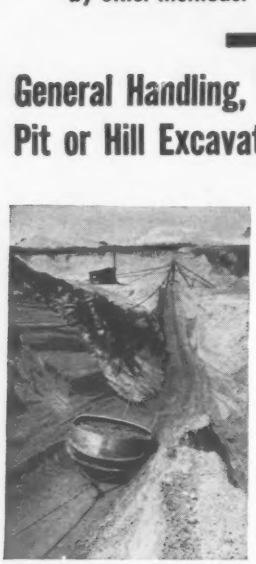
Engineering in Action

Cut Materials Handling Costs . . . Dig *and Haul* In One Operation With A SAUERMAN MACHINE

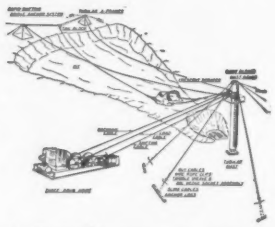
Digging and hauling are reduced to one continuous operation by using either a Sauerman DragScraper or Slackline Cableway. By combining the two basic steps of material flow, equipment and labor costs are halved—or even more. A single machine, controlled by one man, does the same job as the multiple equipment required by other methods.

Profitable handling is further assured by a low maintenance cost of 1½ cents per cu. yd. for an average size installation. Larger machines drop this cost still lower. Important, too, is the money saved on power. You pay only the cost of moving the actual digging tool—the Crescent DragScraper or Slackline bucket. Heavy machines with limited handling-to-dead weight capacity are eliminated.

General Handling, Wet or Dry— Pit or Hill Excavation and Reclamation



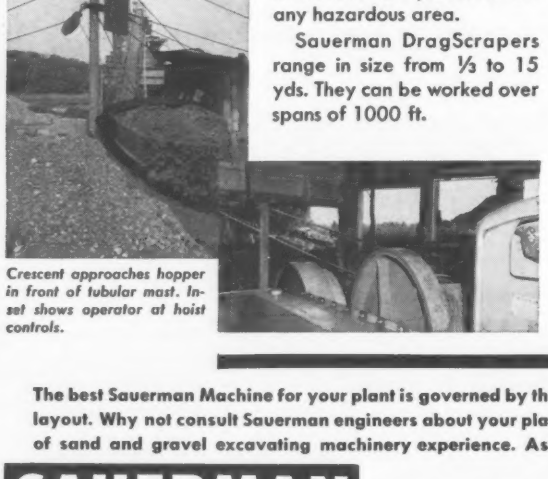
3-yd. DragScraper digs and hauls sand and gravel from pit to plant hopper over a distance of 400 ft.



A DragScraper is recommended for these and similar jobs. This machine handles the toughest digging and operates on a hillside or underwater with as much facility as dry level ground. It hauls directly to hopper, crusher or storage pile.

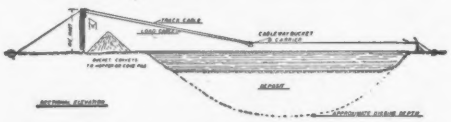
Operation is simple and safe. An inexperienced man can be quickly trained to do the job. Control station and hoist are remotely located from any hazardous area.

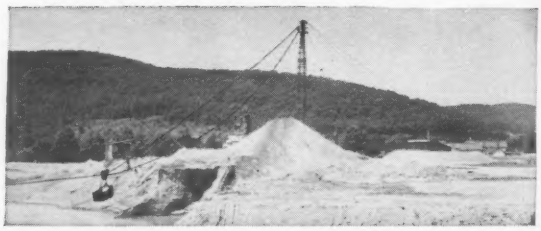
Sauerman DragScrapers range in size from ⅓ to 15 yds. They can be worked over spans of 1000 ft.



Crescent approaches hopper in front of tubular mast. Inset shows operator at hoist controls.

Deep Digging, Underwater Recovery— Conveying to High Delivery Point





This 1½-yd. Slackline Cableway is digging in 70 ft. of water and conveying to stockpile on an average haul of 600 ft.

When deep digging is required—or anticipated in the future—a Sauerman Slackline Cableway is the best machine. This powerful excavator can dig 100 ft. or more below water, lift its load and deliver to a high pile up to 1000 ft. away. This surge pile can be held in readiness for plant needs.

The bucket inhauls at high speed and dumps automatically. The dumping point is determined by a stop button on the track cable. Gravity returns the bucket to the digging point completing the fast operating cycle.

Sauerman Slackline Cableways range in size from ⅓ to 3½ cu. yds. Now available with torque convertor power, the Slackline is increasing its production over 25%.

Bucket automatically discharges onto a 60-ft. high cone pile. Mast in foreground rises 90 ft.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Why not consult Sauerman engineers about your plant? Their recommendations will be based on almost fifty years of sand and gravel excavating machinery experience. Ask for Catalog A (DragScrapers) and C (Slackline Cableways).

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Books

Plumbing Reference

NATIONAL PLUMBING CODE HANDBOOK—Edited by Vincent T. Manas. 544 pp. McGraw-Hill Book Co., New York, Toronto, London. $7.50.

This book not only reproduces the National Plumbing Code (American Standards Association Standard A40.8) but also explains its provisions as each is presented. In addition, related technical data are given.

The editor is executive secretary of the coordinating committee of the several associations that cooperated in preparing the code. Chapters on research findings and special technical material were written by Herbert N. Eaton, former chief, National Bureau of Standards Hydraulics Laboratory.

The book is divided into three parts, the first two of which are devoted to an exposition of the code. Part III describes studies and standards related to the principles of pneumatics and hydraulics applicable to plumbing systems. It points out that failure of U. S. building designers to utilize known data and basic principles in sizing and laying out piping is making plumbing unnecessarily costly.

Concrete Design Manual

CRSI DESIGN HANDBOOK—Second Edition, by R. C. Reese. 447 pp. Concrete Reinforcing Steel Institute, 38 S. Dearborn St., Chicago 3, Ill. $6.

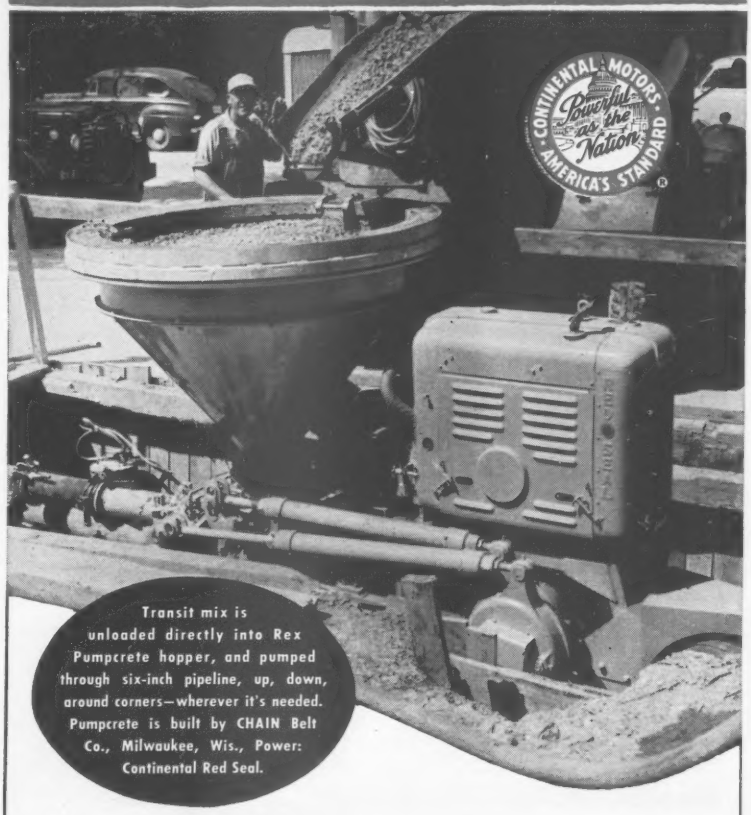
This useful manual for the design of reinforced concrete members has been updated to bring its many tables and charts in line with the 1956 American Concrete Institute building code. It was prepared under the direction of the CRSI Committee on Engineering Practice.

As in the first edition, the data presented makes it possible to select reinforced concrete members with little or no preliminary computations other than determination of loads. One of the most significant additions to the new volume is the inclusion of material on ultimate-strength design.

Reports & Pamphlets

• **Utilization of engineers**—Nine Harvard Business School students, in a team research effort, have produced a study titled "Engineering Manpower: How to Improve Its Productivity." Their research consisted principally of a program of personal interviews supplemented by mail survey. Such subjects as organization, hiring, training, working conditions, personnel admin-

Pumpcrete Speeds the Job
with
DEPENDABLE RED SEAL POWER



Transit mix is unloaded directly into Rex Pumpcrete hopper, and pumped through six-inch pipeline, up, down, around corners—wherever it's needed. Pumpcrete is built by CHAIN Belt Co., Milwaukee, Wis., Power: Continental Red Seal.

Convenience, speed and low cost are some of the advantages of the Pumpcrete concrete placement system over conventional scaffold-and-buggy methods. Costly and time-taking preparatory steps—erection of scaffold, elevators, runways, trestles and towers—are eliminated. The Pumpcrete unit can be located without reference to the final destination of the mix, because quick-change couplings permit lengthening and turning of the line to deliver exactly where needed . . . and when the job is finished, there's no dismantling to be done. Concrete delivery by Pumpcrete is one of many construction operations performed most dependably, at lowest cost, by Continental Red Seal Power.

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WORLD'S LEADING INDEPENDENT MANUFACTURER OF INTERNAL COMBUSTION ENGINES, CONTINENTAL MOTORS OPERATES PLANTS IN ATLANTA, DALLAS, DETROIT, MILWAUKEE, MUSKEGON, AND TOLEDO, AND IN ST. THOMAS, ONT., PRODUCING AIR-COOLED AND LIQUID-COOLED ENGINES FOR USE ON LAND, AT SEA AND IN THE AIR.

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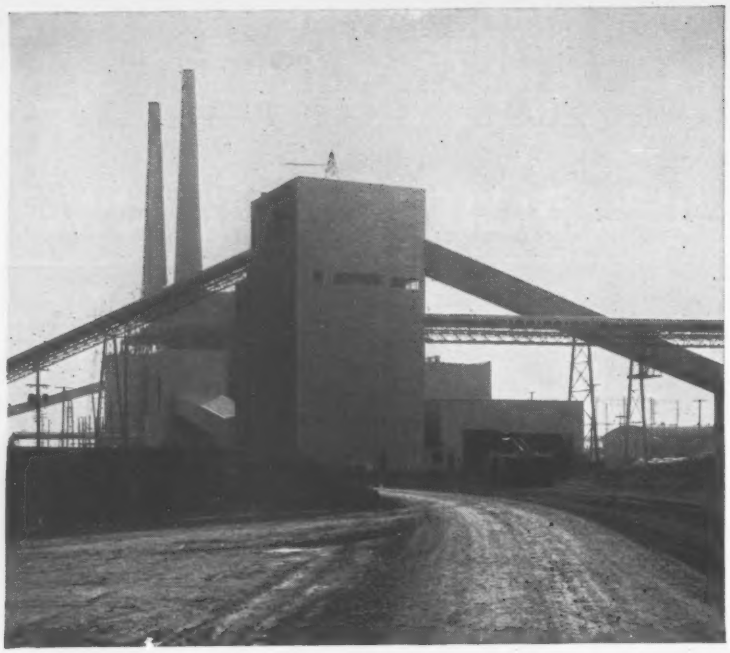

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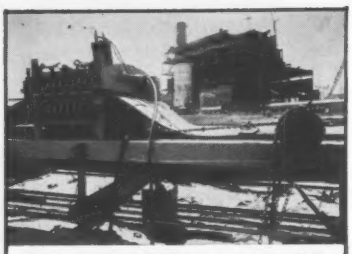
One of the largest in the U. S., this system depends on over 7,000 feet of Quaker Rubber belting to keep the coal moving.

PROBLEM: The Detroit Edison Company needed three separate conveyor systems to carry coal into their River Rouge power plant: (1) dock to storage, (2) dock to breakers to plant, (3) storage to breakers to plant.

SOLUTION: Quaker engineers and the Quaker distributor's men, working with engineers of the power plant, suggested the use of a belting designed for high lifts and long center distances. Over 7,000 feet was installed.

RESULT: The three conveyor systems work smoothly and efficiently, carrying coal into the plant at the rate of one million tons a year.

YOUR PROBLEM: Whatever your conveyor needs, whatever your industry—there's a Quaker Rubber Belt (or Hose) of the *right* construction to handle the job safely and economically. Quaker engineering service is available for the asking.



To make sure 7,000 feet of Quaker Rubber conveyor belting (available in 48", 60" and 72" widths) was properly installed, splicing and vulcanizing of the belting was supervised by a Quaker Rubber specialist.

For your free brochure on conveyor belting, write your nearby Quaker Rubber distributor, or:

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Quaker Rubber Works,
Philadelphia 24, Pa., or
Pioneer Works, Pittsburg, Calif.

QUAKER RUBBER DIVISION

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istration and compensation form a partial list of what these researchers considered in their survey of industry practices and policies. Conclusions from their gathered information on each subject don't boil down to a single sure-cure for the productivity problem; they do not offer any such. But they do propose that a reading of specific findings in their report might net the employer-reader engineering-dollar savings in ideas for better utilizing available technical help. In its general conclusions, the report looks askance at government contracts for their effect on hiring practices; it claims that little conscious effort has been applied by management, in other than large firms, to improve engineering productivity; it urges that management learn to know its engineers better; and it cites planning and leadership as to the two prime ways toward greater productivity. The report is available at $18.50 per copy from Engineering Management Reports, P. O. Box 161, Cambridge 38, Mass.

• **Public school fires**—Most school fires occur when schools are closed and unoccupied, usually at nighttime. Deficient electrical wiring and equipment and heating and cooking equipment are responsible for most fires. This was revealed in a study of 300 public school fires completed by the Fire Record Department of the National Fire Protection Association. Findings of the study along with recommendations for improving life safety and fire protection in schools have been published in NFPA bulletin FR 57-1, Occupancy Fire Record—Public Schools. The bulletin is available for 50 cents from the Publications Dept., National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.

SMALL-SIZE PIPE FOR SANITARY LATERAL SEWERS—National Academy of Sciences, 2101 Constitution Ave., Washington 25, D. C.

UNIFORM HOUSING CODE—1955 Edition—91 pp. Uniform Building Code Assoc., 610 South Broadway, Los Angeles 14, Calif. To members $1.75; non-members, $2.00.

THE PLASTIC METHODS OF STRUCTURAL ANALYSIS—by B. G. Neal. 353 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $7.50.

PUMP SELECTION AND APPLICATION—by Tyler G. Hicks. 422 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $8.50.

GEOLOGY AND OURSELVES—by F. H. Edmunds. 256 pp. Philosophical Library,

Inc., 15 E. 40th St., New York 16. $10.00.

NATIONAL PLUMBING CODE HANDBOOK—Edited by Vincent T. Manas. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $7.50.

1956 SUPPLEMENT TO BOOK OF ASTM STANDARDS—Part 1—Ferrous Metal. 452 pp. Part 3—Cement, Concrete, Ceramics, Thermal Insulation, Road Materials, Waterproofing, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. (Soils. 332 pp.)

GUIDE FOR ULTIMATE STRENGTH DESIGN OF REINFORCED CONCRETE—by Charles S. Whitney and Edward Cohen. 36 pp. American Concrete Institute, P. O. Box 4754, Redford Station, Detroit 19, Mich. 75¢. Enlargements of charts $2.00 a set.

MEMOIRES ABHANDLUNGEN PUBLICATIONS—1955 — International Association for Bridge and Structural Engineering, Swiss Federal Institute of Technology, Verlag Leemann, Zurich.

CONSTRUCTION SURVEYING IN AMERICA—Address by G. Szmak. Construction Surveyors Inst., 101 Park Ave., New York 17.

STATUS OF TOPOGRAPHIC MAPPING IN THE UNITED STATES—7th Edition. U. S. Dept. of the Interior, Geological Survey, Washington 25, D. C.

STANDARD STOCK EXTERIOR WOOD WINDOW AND DOOR FRAMES, COMMERCIAL STANDARD CS208-57—Community Standards-Division, U. S. Department of Commerce, Washington 25, D. C. 15¢.

THE MILITARY APPLICATION OF EVAPORATING COOLING—by R. F. Law and W. R. Nehlsen. PB 111712. 29 pp. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. 75¢.

NAVIGATION CONDITIONS AT MARKLANDS LOCKS AND DAM, OHIO RIVER; HYDRAULIC MODEL INVESTIGATION—by J. J. Franco. Waterways Experiment Station, Vicksburg, Mississippi. 75¢.

HOLDING POWER OF LARGE NAILS AND SPIKES IN DRY SOUTHERN PINE—by E. George Stern. No. 30. Virginia Polytechnic Institute, Wood Research Laboratory, Blacksburg, Va.

WOOD, PLYWOOD OR STEEL GUSSET PLATES FOR NAILED TRUSSED RAFTERS—by E. George Stern. No. 29. Virginia Polytechnic Institute. Wood Research Laboratory, Blacksburg, Va.

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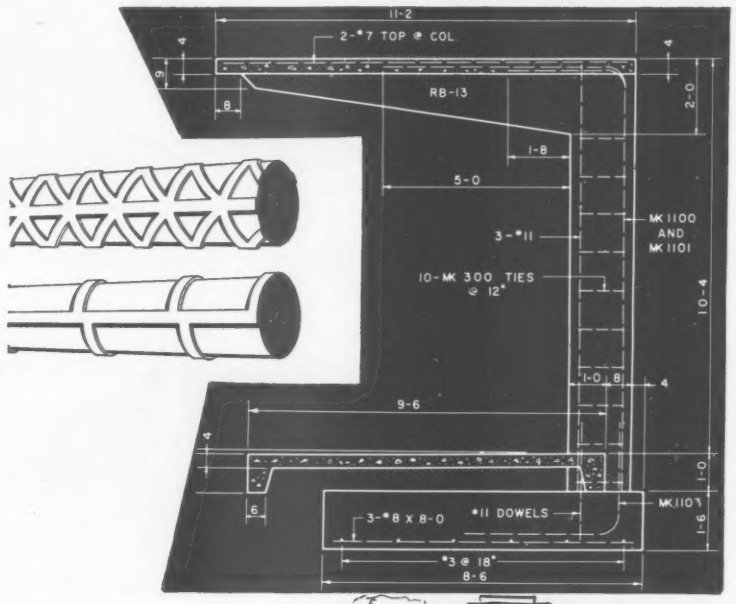

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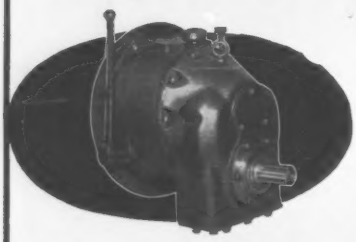

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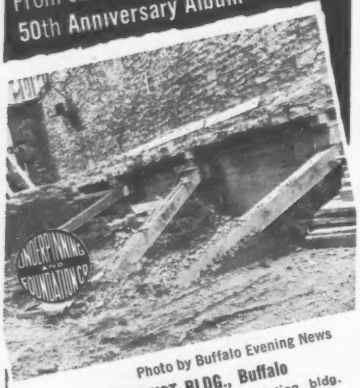

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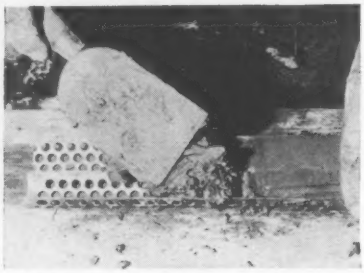
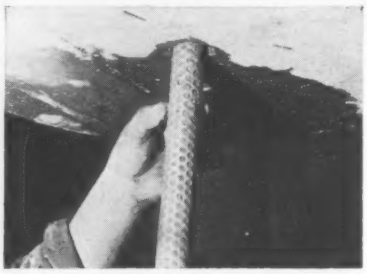
Swedish Roof-Bolting System Introduced

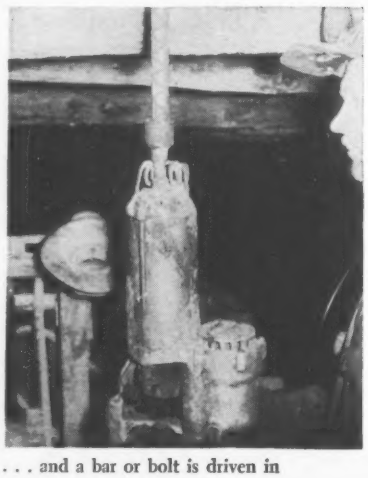


Half sleeves are filled with mortar . . .

. . . tied together with wire . . .



. . . inserted in drill hole . . .



. . . and a bar or bolt is driven in

A fully grouted bolt is possible with the Perfo roof bolting and rock anchoring method, which is simple, economical and reliable according to the manufacturer. The system, developed in Sweden, consists of perforated steel half sleeves that are filled with mortar tied together and inserted in the drill hole. A steel bar is then pushed up through the sleeve, forcing the mortar through the perforations and filling the entire drill hole.

The results are distributed anchorage, high shear resistance and long life, the maker points out. Other advantages claimed: the Perfo system may be used with ordinary reinforcing bars, smooth or threaded bars, anchors or hooks; the installed bars will have same high load capacity at any angle regardless of rock strata; anchorage is effective even in ore passes where there is a tendency for rock to erode.

Where tensioned bolts are needed, the method recommended is to push a short Perfo sleeve to the far end of the drill hole and apply tension to the threaded bolt after the mortar has hardened.

The manufacturer quotes tests where, using a standard sand-cement mortar with accelerators, full strength of 26 tons was developed after one day on 1 in. deformed bars installed in drill holes 28 in. deep.

Made of 20 gage mild steel, the sleeves are stocked in two sizes, 1⅛ and 1¼ in. ID, and in lengths of 4, 6 and 8 ft. Longer sleeves, larger and smaller diameters, can be furnished on special request. Diameters of the drill hole, sleeve and bar are selected so that the mortar volume will fill the drill hole solidly when the bar is driven to refusal by air or electric hammer. PERFO DIV., SIKA CHEMICAL CORP., 35 GREGORY AVE., PASSAIC, N. J.

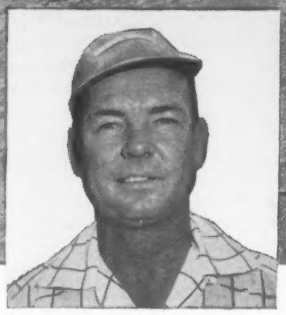
Boom Spot Indicator Will Aid Close Work

A boom spot indicator said to give operators increased effectiveness in boom rig operations now is available for installation on most types of machines.

The indicator, which consists of a circular reel activated by a cable connected to the boom, gives the operator a numerical reading of the boom angle at all times. An integral signal light provides a red flasher warning when the boom is about to enter the danger zone.

The manufacturer claims that the

Four DW15s move 350 yards of hard clay per hour on half-mile haul



H. H. Howard and one of the DW15 rigs, with D8 (Series E) pushing.

Working on State Highway 26, south of Daingerfield, Texas, J. E. & H. H. Howard have a 735,000-yard contract to raise the roadbed and widen part of it to four lanes.

When this picture was taken, all the earthmoving was being done by four CAT* DW15 Tractors with Scrapers, push-loaded by a D8. The spread averaged 3,500 cu. yd. of hard Texas clay per 10-hour day, hauling half a mile.

H. H. Howard says: "Our DW15s have worked steady for a year and a half with no trouble whatsoever except to replace an occasional cable. With the new D8 to push, we can load in a few seconds and keep all four scraper units on the run. Now we're buying a fifth DW15." This unit, incidentally, will make the twenty-fifth DW15 in the Howard fleet.

Now Caterpillar offers a *new* DW15 (Series E) with a new No. 428 LOWBOWL Scraper. The Cat high-torque Engine, specifically designed for the DW15, delivers 200 HP (maximum output capacity). With speeds up to 37.2 MPH, plus the extra sure-footedness of four-wheel traction, this rig gives you faster hauls and cycle times with greater safety. The No. 428 Scraper has a capacity of 13 cu. yd. struck—18 cu. yd. heaped—and it loads quicker and more easily because of LOWBOWL design.

Let your Caterpillar Dealer give you an on-the-job demonstration of this unit. Remember, he stands behind every machine he sells with prompt, reliable service and Caterpillar parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—THE HARD WORK

Here's why you should make
PRESSTITE-KEYSTONE a

for all your paving & building product needs

- EXPANSION JOINTS: PREMOULDED ASPHALT AND NON-EXTRUDING FIBRE OR KAPCORK®.
- ASPHALT BOARDS: TONGUE AND GROOVE JOINTS; DUMMY JOINTS.
- PRESSTITE® COLD POUR JOINT SEALER #67.
- PRESSTITE® COLD POUR JET AIRFIELD JOINT SEALER #99.
- KAPCO® HOT POUR ASPHALT-RUBBER JOINT SEALING COMPOUND.
- JETSEAL® HOT POUR JET AIRFIELD JOINT SEALER.
- KAPSEAL® CRACK FILLER.
- CONCRETE CURING COMPOUND.
- SUB-GRADE FELT . . . AND MANY, MANY MORE.

- ONE COMPLETE BUYING SOURCE
  No need to shop around when you can get all your wants in this giant supermarket of paving products. If you *use* it . . . we *have* it.
- BIG SAVINGS IN MIXED-CARLOAD SHIPMENTS
  Why carry a big inventory on low-need items? Stock only what you'll need—carry a more diversified stock—when you order under Presstite-Keystone's freight-saving "Mixed Carload Plan." Ask us about it.
- ONE CONVENIENT INVENTORY & BILLING ACCOUNT
  Less paper work, easier and faster handling, more net profits for you.
- FAMOUS-NAME QUALITY
  Two reliable names combine to bring you controlled quality, reliable delivery—and a personalized engineering service whenever you need it.

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PRESSTITE-KEYSTONE ENGINEERING PRODUCTS COMPANY
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A Division of AMERICAN-MARIETTA COMPANY
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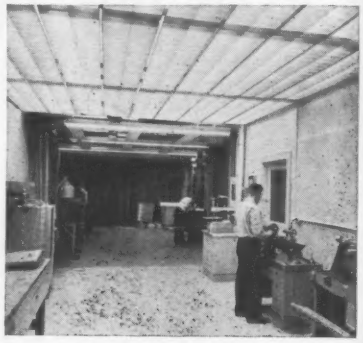
spotter will eliminate costly manual multi-handling operations in such work as sheet setting, casing, blind sighting, loading and unloading, and is particularly adaptable for reproductable spotting. VIKING INSTRUMENTS, EAST HADDAM, CONN.



Lamp Installation Develops 1,000 Ft-c Lighting Level

A new lighting installation produces a lighting level of over 1,000 footcandles, according to General Electric, developer and manufacturer of the installation. This is claimed to be the highest level of comfortable lighting available.

The installation consists of grooved fluorescent tubes and a high-frequency lighting circuit, plus a special louvered shield for light dispersal.

The Power-Groove lamp, as the fluorescent tube is called, contains a series of grooves along its length, which double the light output through more effective control of electrons and mercury pressure within the tube (ENR April 26, 1956, p. 67).

A high-frequency circuit, operating at 400 cps instead of 60 cps, makes possible a reduction in ballast weight of about 20 lb per fixture, reducing heat transfer into the room as well as the total weight of the installation.

The fixture used in the high-level installation has an all-aluminum reflector and louver of a new design mounted on a white channel. The louvers are wedge-shape in cross section. Each side of the wedge has parabolic curved surface. The fixture has 35-deg shielding for both cross and lengthwise viewing. This shielding is responsible for making the high light level comfortable.

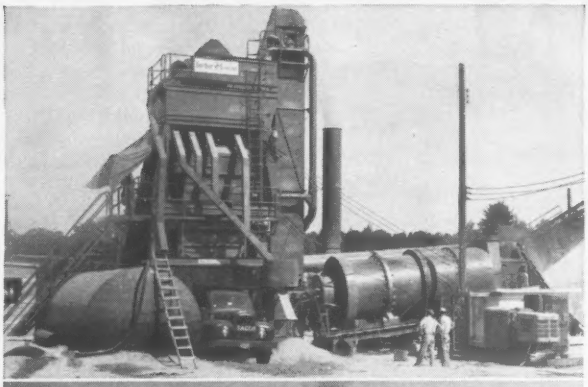
A total of 27 fixtures mounted 10 ft above the floor occupy a 15x24 ft ceiling area. Each fixture contains two tubes. The fluorescent lamps are on 9 in. centers with this arrangement.

According to GE estimates, lighting a 10,000 sq ft area with this system would cost about $10 per hour of operation. GENERAL ELECTRIC CO., NELA PARK, CLEVELAND 12, OHIO.

Why this paving contractor bought his 4th BatchOmatic . . .

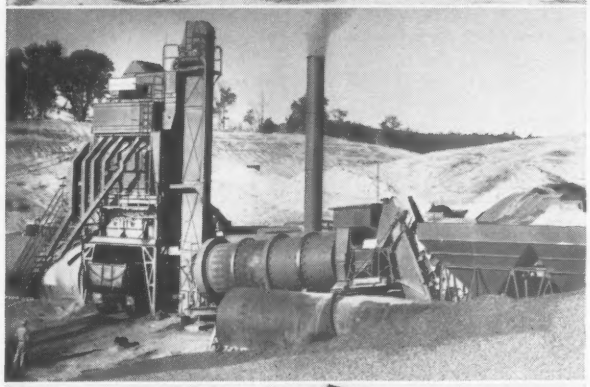
PLANT NO. 1

AUG. '55



PLANT NO. 2

MAY '56



PLANT NO. 3

SEPT. '56

PLANT NO. 4

Bayer and Mingolla had been in the asphalt paving business for many years before introduction of the BatchOmatic. During these years they had vast experience with many different makes of batch-plants, and they are thus ideally suited to judge the merits of the various plants available.

Record production. Bayer and Mingolla's first BatchOmatic is a 4000-lb. Model 894. It had turned out 145,000 tons (including 20,000 tons for the Mass. Turnpike) by October, 1956. Plant No. 3 with a 2000-lb. rated capacity has consistently produced as much as 84 tons per hour.

Record ease of erection. Although set up by a crew completely inexperienced with the BatchOmatic, Plant No. 1 was ready to produce just three days after erection started.

Record low repair costs. The second Model 894 BatchOmatic has produced more than 102,800 tons for turnpike and state work. Total repair costs for this tonnage amounted to $200 or just 2/10ths of a cent per ton of mix produced. After producing more than 145,000 tons, Plant No. 1 is still using the original paddles and pugmill liners.

Exclusive features include:

Simultaneous weighing of all sizes of aggregate . . . eliminates the human element in achieving accuracy and maximum capacity.

Instant change-over from automatic to manual operation . . . provides mixes for the drive-in trade . . . instantly reset to preset repetitive cycle operation.

New Dyna-Mix pugmill . . . gives thorough coating in less time than any other pugmill.

Instant, positive inspection of aggregate gradation and weight.

Plant No. 4, a Model 894, has just been shipped and will probably be in operation before this ad appears.

Literature on request.

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

Pump Liquid WASTE with the weil Heavy duty Sewage Ejector

The Weil screenless sewage ejector with the NON-CLOG impeller effectively handles large diameter solids, rags and stringy material of various lengths which are washed into the sewage pit.

RUGGEDLY BUILT: This factory assembled unit has an ample reserve of strength to meet the most severe conditions and furnish years of trouble free operation.

SIMPLIFIED PIPING: Only one piping connection required. An economical installation.

The **NON-CLOG** Impeller (illustrated below) built into the WEIL Screenless Sewage Pump supplies the ideal method of pumping sewage and unscreened liquids containing solids.

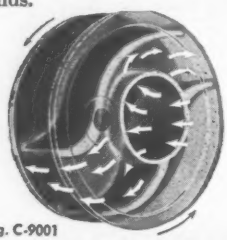
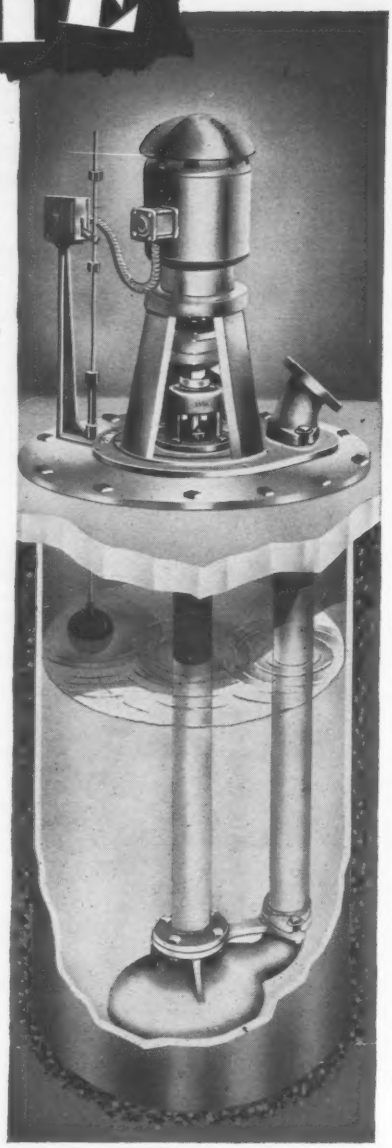


Fig. C-9001



Successfully handles the tough jobs where other pumps fail.

Send for Bulletin C-900 E. Weil Representatives and Weil Engineers are available to help solve your waste pumping problems.

See Catalog in 1957 Sweet's and 1957 Domestic Eng. Cat. Dir.

weil PUMP CO.

1528 No. Fremont St. Chicago 22, Illinois

Publications

Belgian cement—Detailed information, test reports, comparative strength diagrams and other engineering data covering a new Belgian high early strength portland cement is presented in a 12 page bulletin. INDUSSA CORP., 511 FIFTH AVE., NEW YORK 17, N. Y.

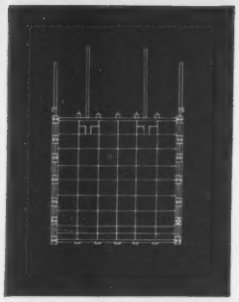
Enamel Curtain walls—A 28 page publication, "Design Manual, Part 2, Porcelain Enamel in Architecture, Curtain Wall Construction," explains the advantages of porcelain enamel curtain wall panels and gives details of panel fabrication, assembly, joint design and methods of attachment. Many typical installations are illustrated together with cross section drawings of the panel assembly. PORCELAIN ENAMEL INSTITUTE, ASSOCIATIONS BUILDING, 1145 NINETEENTH ST., N.W., WASHINGTON, D. C.

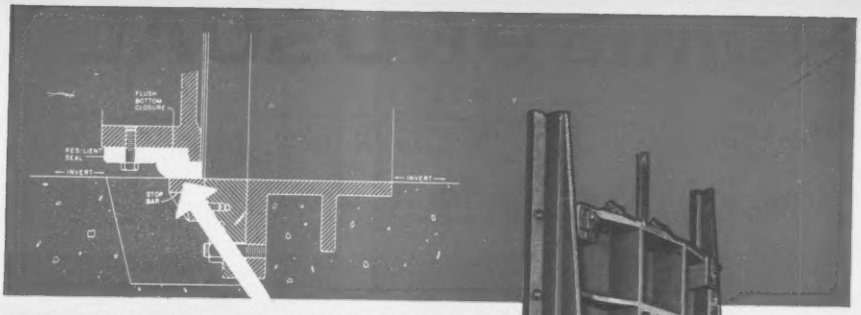
Sanitary landfill—An 8 page illustrated booklet describes features and methods of sanitary landfill for garbage disposal, giving cost figures and equipment necessary. CONSTRUCTION MACHINERY DIV., ALLIS-CHALMERS MFG. CO., MILWAUKEE 1, WIS.

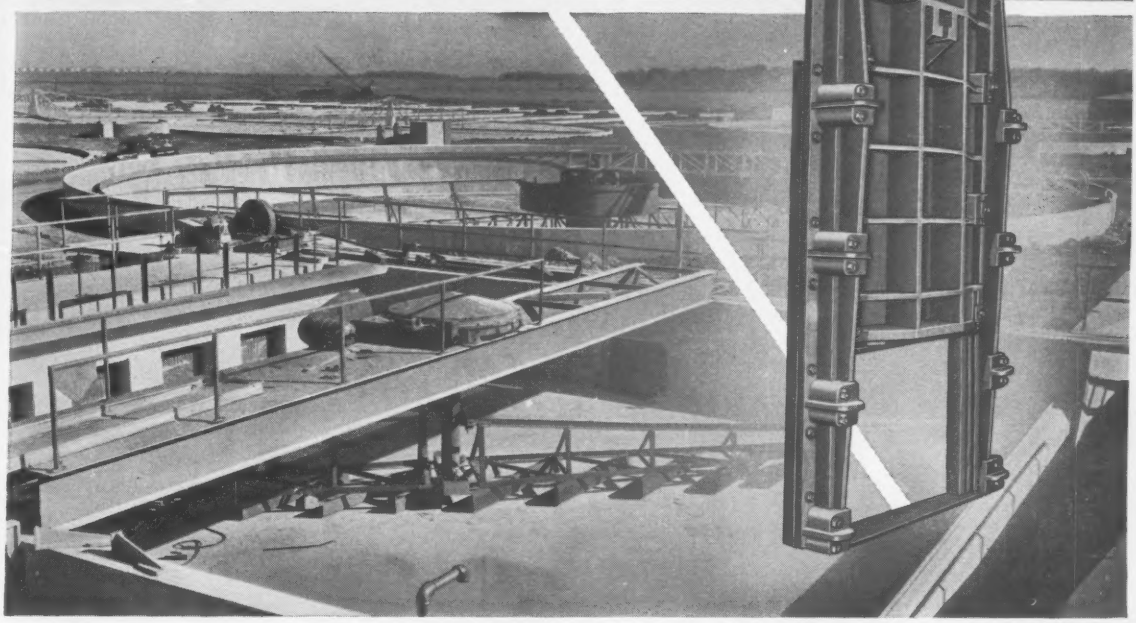
Industrial plastics—A new presentation booklet and plastics material guide features examples of plastic fabrication methods with illustrations of the type products best suited to each method. An extensive chart, showing the characteristics of tough, rigid thermo-plastics also is included. L. A. DARLING CO., BRONSON, MICH.

Dust precipitator—A 16 page bulletin describes a new dynamic precipitator, the Type W Roto-Clone, to which a water spray has been added to the basic dynamic precipitation. Wiring diagrams, engineering data, pipe resistance chart, erection diagrams, dimensions for sludge settling tanks and humidifying efficiency graphs for the precipitator are included. BULLETIN NO. 274B, AMERICAN AIR FILTER CO., INC., 215 CENTRAL AVE., LOUISVILLE, KY.

Plywood diaphragms—A 10 page booklet titled, "Basic Facts about Fir Plywood Diaphragms," contains a general description of a diaphragm and cost, building code acceptance, and grade specifications of plywood for diaphragms. Sections are devoted to advantages of the diaphragms, explanation of how the diaphragm works and tables showing relative performance in regard to deflection under shear stress. DOUGLAS FIR PLYWOOD ASSOCIATION, TACOMA 2, WASH.







only HY-Q sluice gates seat flush with channel bottom!

The unique Rodney Hunt HY-Q® Sluice Gate incorporates a heavy strip of tough, resilient material in the bottom of the gate disc which makes a tight seal against a sill flush with the channel bottom. Silt and debris wash clear each time the gate is opened; cannot pile up and interfere with operation.

HY-Q sluice gates assure maximum clear opening and greatest possible flow; reduce turbulence to a minimum. Improved flow means substantial economies . . . smaller gate size, narrower channel and lower channel walls. Because HY-Q gates seat at the lowest level of the channel, there is maximum hydraulic gradient. 16 Rodney Hunt sluice gates are used in this modern sewage treatment plant — Beaumont, Texas — pictured above.

Rodney Hunt HY-Q Sluice Gates with flush bottom closure are designed to give water control engineers and contractors far greater design flexibility in dams, water filtration, sewage, power plants, flood and irrigation projects. For further information write for Catalog No. 75.

RODNEY HUNT MACHINE CO.

Water Control Equipment Division
85 Lake Street, Orange, Massachusetts, U. S. A.

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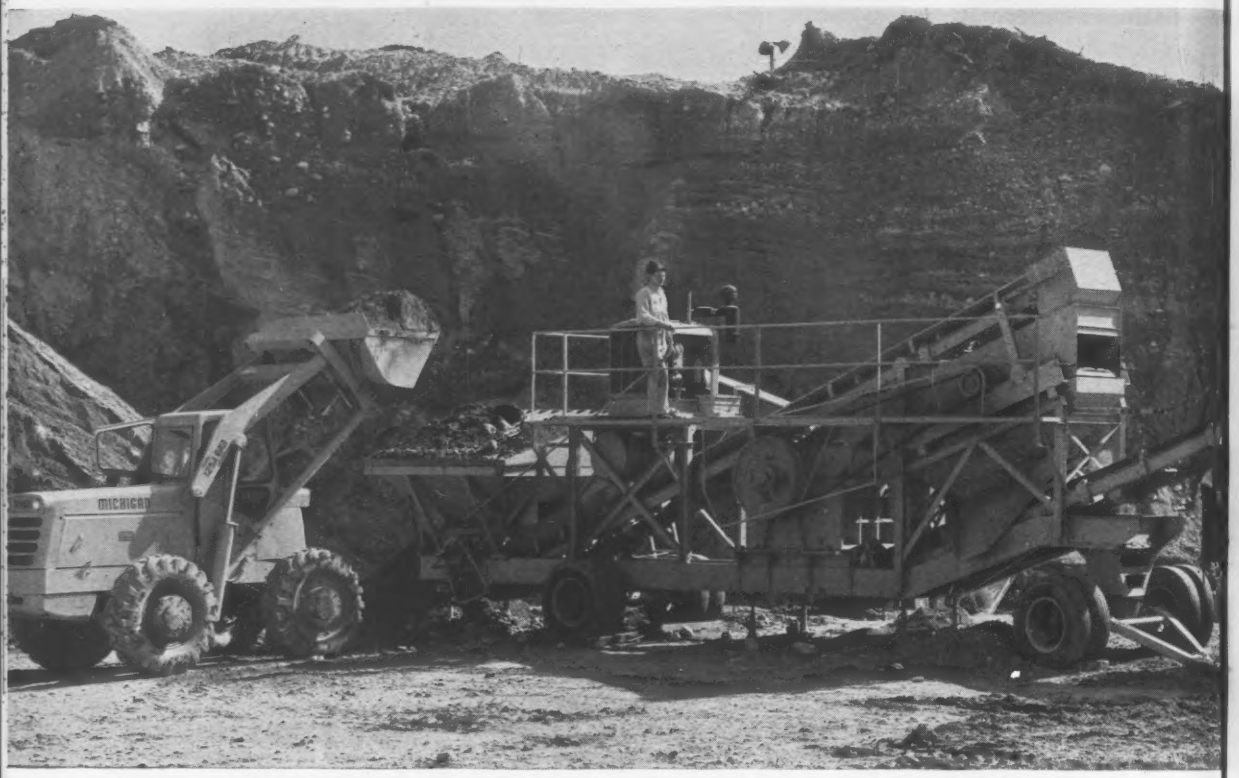
SERVING WATER CONTROL ENGINEERS WITH SLUICE GATES AND ENGINEERING

SOME UNUSUAL WAYS

Michigan Tractor Shovels are saving time and money for road builders around the country



Feeds portable crusher—Making good use of its high lift, Michigan Model 125A digs and dumps raw bank gravel into hopper of 100-ton-per-hour base material plant. Photo comes from Southern Hills Inc. pit near Dayton, Ohio, where the 2 yd Michigan did the work of a more expensive, less versatile, far less mobile excavator-crane.

Grades shoulders—Special side bucket attached to Michigan 175A grades 3 ft shoulder next to newly-poured slab. Unique rig does jobs not possible with grader drop-blade . . . including filling holes, distributing gravel, removing spoil. Attachment, designed by Villa Contracting Co, is helping widen 27 mi of N.J. Garden State Parkway.

Pours concrete—Hauling concrete in Michigan Tractor Shovel bucket, Slattery Rock Corp. solves problem of laying 6 lanes of New York's Deegan Expressway under low viaduct. Two of these maneuverable "buggies" needed only 4 hours, 200 to 250 trips to pour 800 ft of each 12 ft lane.

Carries pipe—One of Peter Kiewit's Michigans serves as all-around handyman on company's Indiana Turnpike contract. This 102 hp model lifts up to 11,000 lbs, carries, 5,500 lbs at 4 mph. Note excellent all-around visibility given operator.

Breaks, loads asphalt—Before resurfacing street in Worcester, Mass., Contractor Charles. Chaffee uses 1¼ yd Michigan to strip old asphalt. No "ramming" is required—powerful breakout quickly shatters paving.

Cleans pavement—Highway must stay open said Nashville officials, so Wright & Lopez do cleanup with small, agile 16 cu ft Michigan. Only 4'2" wide, 10'8" long, unit works rapidly, doesn't block traffic, doesn't damage newly-set pavement.

Removes sewer cover — When other big loaders failed, Kirby-Erwood's 133 hp Michigan succeeded in prying off this 2-ton concrete cover. Assignment was part of cleanup before widening Los Angeles freeway.

Digs shot rock—Time studies proved to Cummings-Roberts, Darby, Montana, that this 2¾ yard Michigan would outproduce crawler-loaders in both pit-run and shot-rock, despite narrow benches, 7000' altitude.

Breaks, loads concrete—On New York City street repaving job, Triboro Asphalt Co. breaks and loads 4 to 6-inch concrete slab with this 133 hp Michigan Model 175A.

Kinnear Rolling Doors

Kinnear Steel Rolling Doors *introduced* the **single-shaft torsion spring.** It assures *uniform* spring action . . . *uniform* regulation of operating ease from a **single adjustment wheel.** Many other special features make Kinnear your best door buy! Send for catalog!

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
1820-40 Fields Ave., Columbus 16, Ohio
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2052 ST. CATHERINE ST. WEST, MONTREAL

Success Story

Courses to train highway personnel to be expanded

The first results of a three year pre-professional highway engineering training course established by the Maryland State Roads Commission have been so successful that five additional classes are to be started soon, a commission announcement said last month.

In addition, county engineering departments have been invited to send their employees to the new classes.

According to the commission, the courses are aimed at large groups of personnel in its various engineering divisions who have only high school educations. It had long been felt that if these men were given the opportunity to pursue an intensive course in the fundamentals of highway engineering, both they and the commission would benefit.

Arrangements were made with the University of Maryland, to administer the program, and place it under one of the university's divisions—the College of Special and Continuation Studies.

The classes were conducted on a college-level basis, at a rate of five hours of instruction per week. On this basis the commission was willing to give the students educational credit toward promotional examinations. For successful completion of this three-year night course the employee was allowed the equivalent of one year engineering college credit.

• **Teaching outline**—The first year began with a brief review of high school algebra, then advanced to algebra of college grade, and basic concepts of trigonometry and analytical geometry.

These subjects could not be presented in full detail in the limited time, but the essentials needed by the highway employee were fully covered.

The remaining period of the first year was devoted to a series of lectures termed "Highway Orientation". Lecture subjects included administration and finance, history and economics, location and surveys, preparation of highway and bridge plans, rights-of-way, contracts-specifications, highway drainage, soils, pavements and construction.

The second year's curriculum was devoted to a practical course in engineering mechanics and strength of materials. A practical problem in highway location was also presented. Each student was furnished with aerial photogrammetric coverage of an area of the state where an existing highway was to be relocated. A series of lectures dealing with the fundamentals of location were presented. Ten weeks of the second year were devoted to the problems of highway drainage.

The third year was devoted to field demonstrations and practice in surveying techniques such as slope staking, curve layout, and spiral layout. Then followed a period of structural design of pavements. This period covered thickness design for various pavement types, and also the design of all steel in the rigid pavement type. The remainder of the year, was devoted to geometric design problems, with the A.A.S.H.O. Rural Policy being used as a text.

• **Record good**—Of 50 students starting, 16 completed their entire three years of work. Three students failed to complete one semester's work but it is believed they will finish in the fall.

As for financing—the State Roads Commission shares one-half of the cost of the first three years. If the student remains with the commission the fourth year, he is refunded one-third of the amount he paid. If he stays five years he gets another third of what he paid, and for a sixth year he gets the remaining third he paid. In other words, for those students who complete the three year course and remain with the commission three years more, the commission pays the full tuition.

Rhode Island Educates Engineers for Others

Out of a class of 110 engineering students graduated from the University of Rhode Island this summer, all but three—one industrial and three civil engineers—took jobs outside Rhode Island.

Poor industrial climate, low salaries and lack of opportunities were given as the reasons for students ignoring local firms, according to a poll of 48 members of the class.

Raymond H. Stockard, university placement officer, who made the poll, blamed Rhode Island industries partly for not hiring engineering graduates from the state university.

He said only seven out of more than 800 firms in the state responded to invitations to interview graduates on the campus before graduation.

But, students polled indicated that few would take a job in the state even if asked by local industries because of low salaries and poor advancement opportunities.

"324 tons per hour with 35% crush . . .

Wet and dry gravel crushed to 1" base material . . .

Maintenance costs estimated at 3/4¢ per ton . . .

Very little down time . . ."

Cedarapids Built by IOWA

No wonder Frank McLaughlin, President of F. J. McLaughlin Co., Marshall, Minn., is so well satisfied with his

CEDARAPIDS JUNIOR TANDEM

For some 14 years, Cedarapids Junior Tandems have always been hard plants to beat for high tonnage production. Newly re-designed last year, today's Junior Tandem adds a new kind of versatility to its profitable high capacity. With its bigger screen, and choice of jaw and roll crusher sizes which can be matched or mixed to give big primary capacity, big secondary capacity . . . or both . . . *the Junior Tandem is adaptable to the pit conditions you have to meet.*

Only a complete description of every Junior Tandem feature can show you how this plant will fit your profit picture. Ask your nearest Cedarapids distributor for details and production figures.

Apply these NEW JUNIOR TANDEM FEATURES to your job!

YOUR CHOICE OF CRUSHER SIZES

10" x 36" jaw crusher gives extra primary capacity when crushing percentages are high. 10" x 24" jaw crusher meets average conditions. 30" x 18" roll crusher assures production of high percentages of fine-crushed product. 24" x 16" roll crusher meets normal secondary crushing requirements.

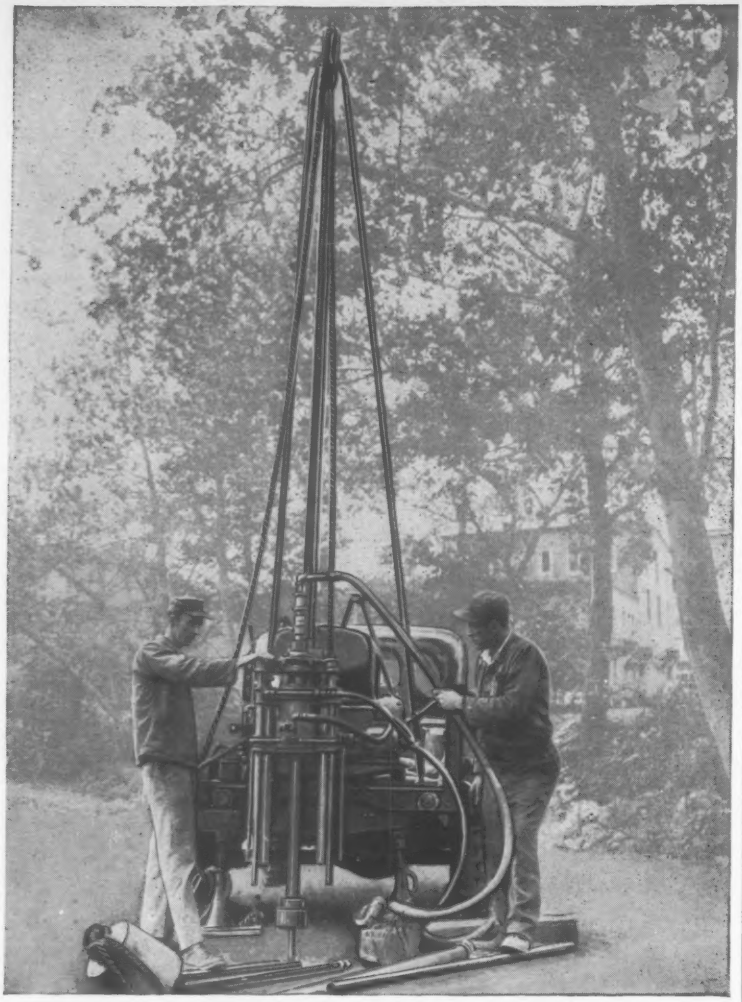
BIGGER SCREEN

Width of the Horizontal Vibrating Screen has been increased 6" and a half deck has been added. The 42" x 10', 2½-deck screen produces from one to three products simultaneously, from 2" road ballast down to minus ¼".

"BIG PLANT" FEATURES AT SMALLER PLANT COST

Junior Tandems now available with sand ejector screw and washing spray bars (optional); monotype elevating wheel; delivery conveyor backstop; belt wipers; self-cleaning pulleys; new type adjustable eccentric on reciprocating feeder; larger hopper; separate clutch control on screen.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.



SPRAGUE & HENWOOD MAKES THE EQUIPMENT FOR THE SOIL SAMPLE OR ROCK CORE YOU WANT

With the earth-shaking increase in construction, you need efficient, versatile sampling and coring equipment.

Sprague & Henwood, Inc., a leading manufacturer of all types of equipment for foundation investigation, has just the right type for you!

Illustrated above, on location, is a truck-mounted Sprague & Henwood Model 30 Core Drill Machine. On this foundation project this machine is recovering both good samples and good cores. The soil samples have already been recovered from this boring and now the machine is being used to core rock. Because of the versatility and economy of this machine it is becoming a favorite of many contractors and other users throughout America.

The proper machine alone will not give you the good soil samples and rock cores you want. You need just the right samplers, accessory equipment and coring bits. If you need a sampler to determine only the general classification of the sub-surface soils or a sampler to secure samples for testing in a soils laboratory, Sprague & Henwood has it. There is a complete line of accessory equipment and the best in "Oriented" Diamond Bits awaiting you. One call . . . to SPRAGUE & HENWOOD, Inc., and your drilling equipment needs can be met.

SPRAGUE & HENWOOD, Inc.
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Obituaries

Charles E. Morrison, 79, retired civil engineer, died June 29 in Philadelphia. He received his engineering degree in 1901 and his doctor's degree in 1908 from Columbia University, and taught engineering there for several years.

Leo S. Hillebrand, 70, retired vice president and treasurer of A. Bentley & Sons Co., Toledo contractors, died July 4.

John E. Jones, 73, pioneer in mine safety, died in Benton, Ill., July 1. Five years after receiving a degree in civil engineering from Valparaiso University in 1910, Mr. Jones was appointed as an Illinois state mine inspector. He joined Ben Coal Corp. in 1917 as its safety engineer, and retired in 1953.

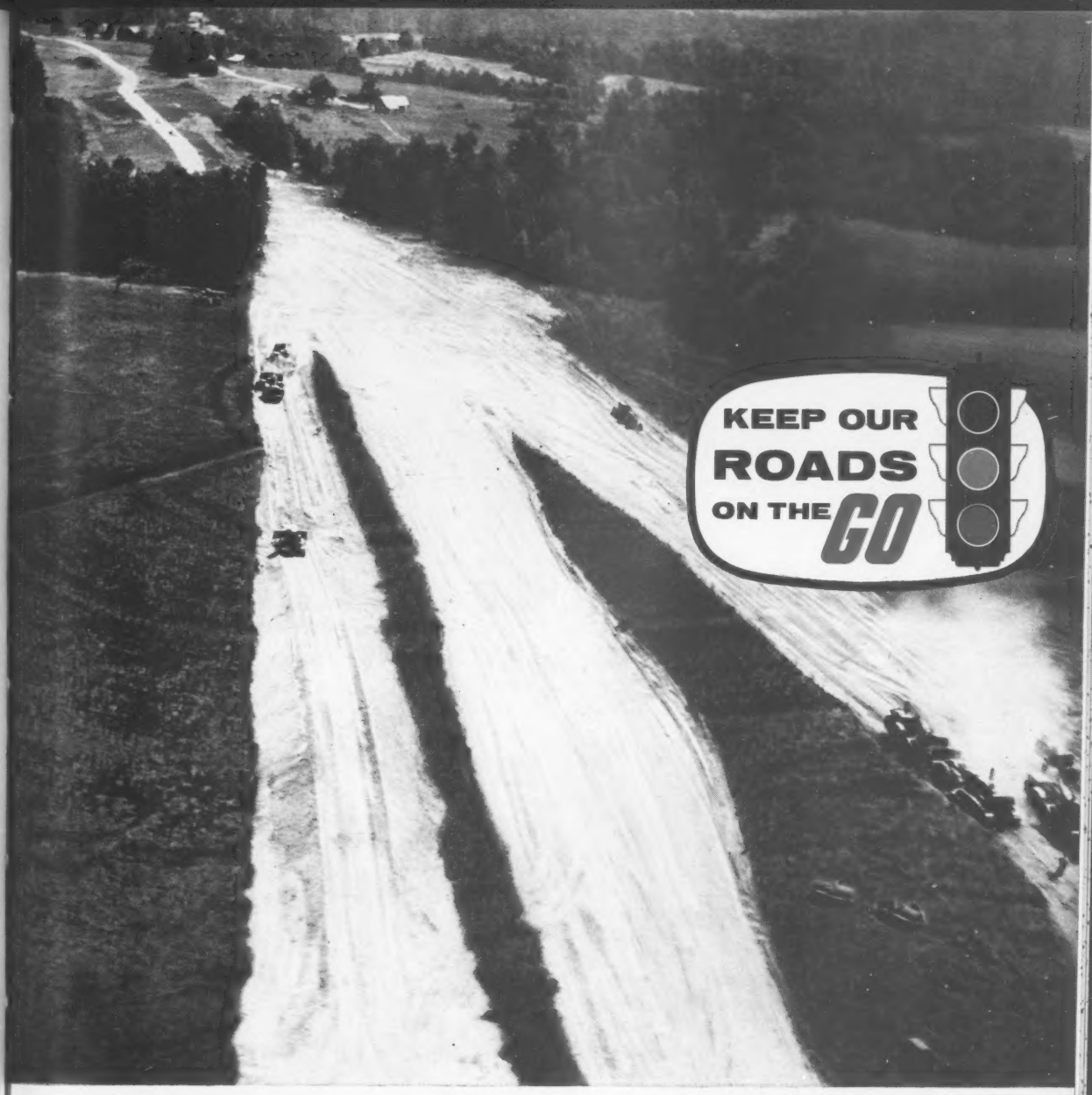
W. R. Binney, 76, consulting engineer and former chief engineer of Canadian Steel Foundries, Longue Pointe, Que., died July 2.

Mark K. Wilson, Sr., 71, Chattanooga building contractor, died July 2. He was the head of Mark K. Wilson Co., which put up many of Chattanooga's best known buildings.

Marion R. Finley, construction engineer who had a part in building the Alcan Highway, died in Atlanta, July 4.

Willard H. Johnson, 55, engineer, died July 18 in Summit, N. J. Mr. Johnson was an engineer in charge of editing reports on municipal fire-protection surveys for the National Board of Fire Underwriters. A graduate of the U. S. Army Engineering School and the Command and General Staff School, he attained the rank of colonel while serving with the Army Engineers in World War II. He formerly was cost engineer for the Pennsylvania Turnpike Commission and city manager for Rehoboth Beach, Del.

John J. Relihan, 60, manager of the sanitary engineering department of Gibbs & Hill, Inc., New York City, died July 31. Mr. Relihan first joined the firm in 1926 as a draftsman working on railroad electrification. His experience included work on airbase design before he took over the Gibbs & Hill sanitary engineering department in 1940. During one of his two short periods away from the consulting firm since 1926 Mr. Relihan worked with Ash, Howard, Needles & Tammen on the Mississippi River bridge at Natchez, Miss. He was a graduate of Catholic University in Washington, D. C.



The Highway Program is "*on the go*" in the Carolinas . . .

As of June 1st, North Carolina was already at work on 98 miles of the 714 miles of the Interstate System designated for the State. It thus ranked second only to Texas in the number of miles of highway under actual construction in the Federal Program.

In South Carolina, too, where a total of 769 miles of interstate highway will be constructed, work on U. S. Route 176, the first access road in the State, is well underway.

In North Carolina the program was developed under A. H. Graham and is now under the direction of W. F. Babcock, Director of Highways. In South Carolina, C. R. McMillan, Chief Highway Commissioner, is in charge.

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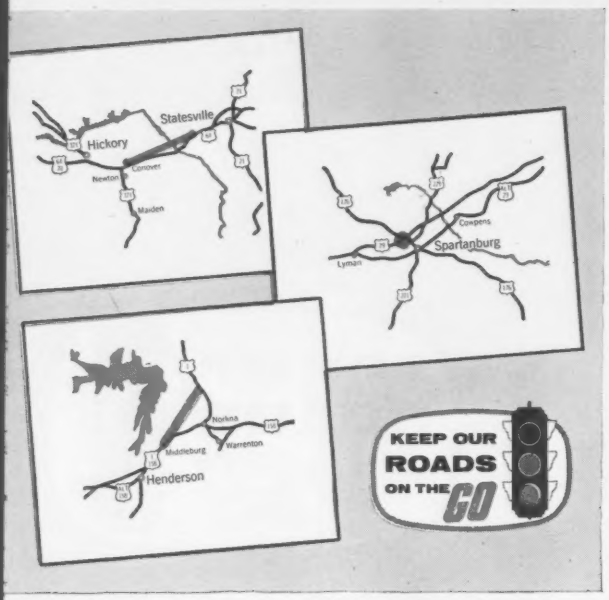
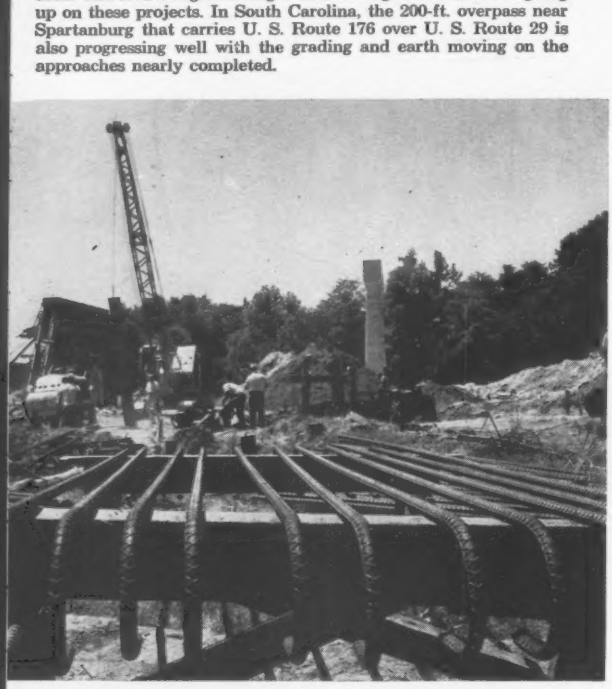
...and products of United States

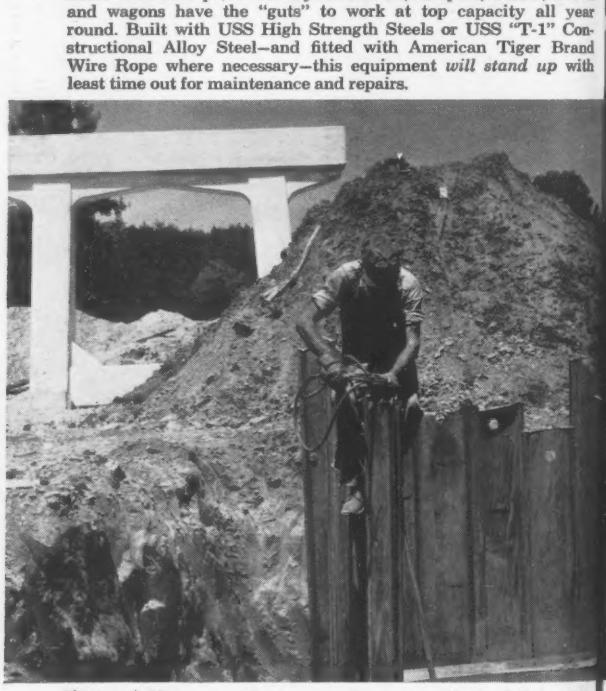


In North Carolina, work is being rapidly pushed ahead on U. S. Route 1 near Henderson and on U. S. Route 70 in the Hickory area. Thirteen bridges having a total footage of 4114 ft. are going up on these projects. In South Carolina, the 200-ft. overpass near Spartanburg that carries U. S. Route 176 over U. S. Route 29 is also progressing well with the grading and earth moving on the approaches nearly completed.

Construction of the Interstate System will involve the moving of an estimated 41 *billion* cu. yds. of earth. Your part in this job will be easier and more profitable if your shovels, scrapers, dozers, trucks and wagons have the "guts" to work at top capacity all year round. Built with USS High Strength Steels or USS "T-1" Constructional Alloy Steel—and fitted with American Tiger Brand Wire Rope where necessary—this equipment *will stand up* with least time out for maintenance and repairs.



An estimated total of 49 million tons of steel will be used for the Interstate System. More than one-quarter of this, 13 million tons, will go into bars for concrete reinforcement, much of it into USS Di-Lok Reinforcing Bars. Specifically designed to produce better reinforced concrete at lower cost, USS Di-Lok Bars feature a continuous, diamond-locking deformation that assures positive anchorage, reduces cracking to a minimum, makes shorter splices possible and frequently eliminates hooks.



Thirteen bridges are going up on the two sections of Interstate Highway now under construction in North Carolina. For your cofferdams, bridge abutments and retaining walls, USS Steel Sheet Piling and USS Steel Bearing Piles provide easily installed construction that is strong, rugged and lasting. Both are finished products, ready for use as shipped; installation is practically independent of weather conditions.

USS
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Steel help *speed* road construction

A penny's difference in the cost of moving a yard of earth can be the margin between profit and loss on a road-building contract. That's why your earth movers must not only be big-capacity and fast-moving but must have the rugged stamina to stay on the job day after day. Super strength in parts that take a beating, high resistance to shock loading, fatigue and wear can be most economically obtained with USS High Strength Steels, and USS "T-1" Constructional Alloy Steel.

In bulldozers, scrapers and graders, the moldboard takes punishment. Here are concentrated the destructive forces o abrasion and impact shock—all of which are amplified with increase in equipment power and speed. For this reason, steels have been continually improved. Now, with USS Abr Resisting Steel, USS MAN-TEN and USS TRI-TEN high strengt steels and USS "T-1" Steel available, shutdowns due to mold board failure or premature wear-out can be practically eliminated

These piers are typical of the bridge construction on the new section of U. S. Route 70 near Hickory, N. C. For such structures and for the concrete roadway as well, Atlas Duraplastic—an air-entraining portland cement—will give you more cohesive concrete that dumps, spreads and finishes easily. Atlas Duraplastic concrete has greater durability, and is fortified against freezing-thawing weather, yet it costs no more than regular cement.

268 feet of 60-inch steel pipe will be used in the culverts on t new 12.7 mile stretch of U. S. Route 1 running from Henders N. C. to the Virginia border. Combining low initial cost, fast a easy handling and installation, high strength and great durabili USS AmBridge Sectional Plate and USS Corrugated Steel C verts offer you the most economical drainage structures availab

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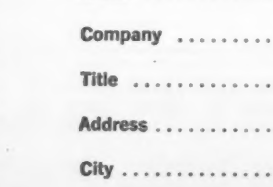

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This laboratory test shows an acid-treated sample of clay that supports a load while the untreated sample fails within a few hours. It is part of an exploration in chemistry to discover a means of . . .

Stabilizing a Problem Soil—Cheaply

J. W. Lyons
Research Department
Inorganic Chemicals Division
Monsanto Chemical Co.

A novel method of stabilizing heavy clay soils against the detrimental effects of water has been developed in Monsanto Chemical Co.'s Inorganic Chemicals Division research laboratories.

When about 2% of phosphoric acid is added to a fat plastic clay and the material compacted, a hard, durable mass is produced that will withstand prolonged exposure to water and to wintering. When a second material, such as Monsanto's Amine ODT, is added to the phosphoric acid in amounts of .5% or less (based on soil weight) a superior stabilized soil results according to laboratory reports.

Soil treated with the above combination is less plastic; can be readily mixed at moisture contents well above the optimum; the strength of the soil will not be as critically dependent on the amount of water present at the time of compaction; and the soil is sufficiently waterproofed so that it is water resistant even during the early stages of the time required for complete reaction.

• **Stabilization**—The term of "soil stabilization" can refer to any process that will alter an engineering property of a naturally occurring soil to better suit the end use of that soil. Much of the work in stabilization has been aimed at converting loose, poorly graded sands, silts, fats and plastic clays into satisfactory load bearing materials.

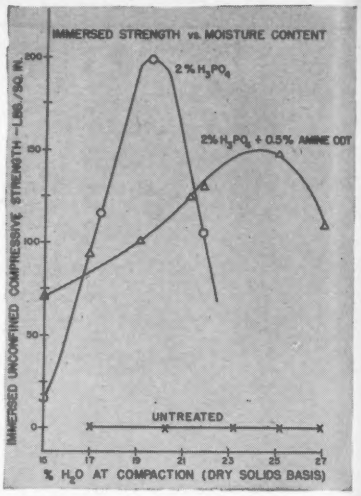
Of the many potential applications to which soil stabilizing agents may be put, one specific usage appears to hold the greatest promise for large scale development in the near future: chemical stabilization of highway subgrades and base courses. The increased volume of highway construction, more stringent design requirements for roads and growing shortages of select soils and aggregates have extended and expanded the need for additives to alter soil properties.

Problem soils containing predominantly poorly graded sand and/or silt may often be stabilized effectively with asphaltic materials or with portland cement.

Soils containing larger amounts of clay minerals and having a Plasticity Index of above about 15 are almost impossible to treat with today's commercially available stabilizers. For example, a clay soil having a P.I. of 24 and containing about 30 to 35% clay minerals (chiefly montmorillonite) requires more than 10% portland cement for stabilization and could not be stabilized with asphalt. Normal practice is to dig out such a clay soil and replace it with gravel, often hauled many miles at great expense.

An alternative presently gaining some favor is to treat the heavy clay soils with lime in amounts of from 4 to 10%, or with mixtures of lime and fly ash. These methods, although still considered to be in an experimental stage, show promise despite the drawbacks of large volumes to be handled, and variations in calcium-magnesium ratios in the available lime sources.

(*Continued on page 102*)



Comparative analysis of treated and untreated soil samples.

When dry, clay soils exhibit exceedingly high bearing strengths and would be suitable for subgrade or base course construction. In a wet condition, however, the soil structure expands considerably and much, if not all, of the bearing strength is lost. This combination of volume instability and lack of strength under wet conditions prevents the use of untreated clays in all but the most arid parts of the world.

Clay soils may be stabilized by cementing the particles together, altering the colloid surfaces with electrolytes and waterproofing by adding hydrophobic agents.

It has become apparent that an effective stabilizer for heavy clay soils will need to have some of the effects of all three methods. Thus, flocculation of the clay fraction is necessary for easing the mixing problem and waterproofing may well be required in the case where excessive moisture is present before the cementing reaction has occurred.

• **Laboratory tests**—In evaluating Monsanto's new soil treatment, laboratory soil samples were prepared from air dry soil pulverized to pass a No. 4 mesh screen. Characteristics of the test soil were, liquid limit 46, plastic limit 22, plasticity index 24 with an optimum moisture content of 15% and a maximum dry density of 117 pcf. The clay mineral content was 30-35%, of which about ¾ was montmorillonite.

Soil, water and chemicals were mixed mechanically and samples then compacted in a modified Vicksburg compactor. Compaction was accomplished by dropping a 4 lb weight

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New transistorized power supply for two-way radio

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The all-new General Electric Transistorized Power Supply—part of G.E.'s advanced Progress Line—replaces the receiver portion of the mobile power supply and eliminates the receiver vibrator.

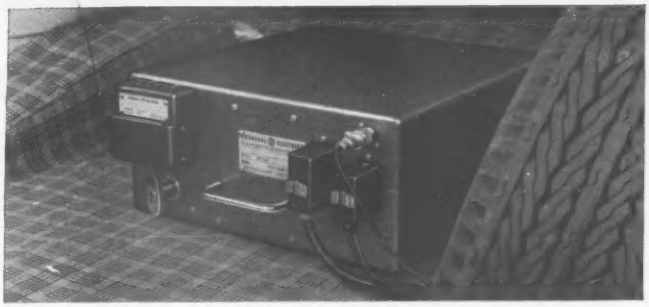
Here's what this means: Previously you had to replace receiver vibrators several times a year. Our surveys indicate each replacement costs you from $10 to $18, depending upon service call mileage. Now you can install a power supply costing only $54.50 (when installed in new equipment at the factory, just $44.50) which has the same life expectancy as your entire mobile combination. *The new G-E Transistorized Power Supply will easily pay for itself the first year or two on vibrator replacements and service calls!*

Easy to install—Three mounting studs fasten the new unit to the front of your case or inside the older, two-unit design equipment. Electrical connections are simple: only four leads to attach.

Eliminates "Vibrator Hash" — All traces of the "vibrator hash" which interferes with clear reception are gone for good.

Easily added to any 12-volt system — The new power supply can be used with all standard makes of two-way equipment which operate from an ordinary 12-volt power source.

Saves you money when drivers forget—When drivers neglect to turn off their radios before starting a vehicle, the new transistorized power supply cannot be damaged.



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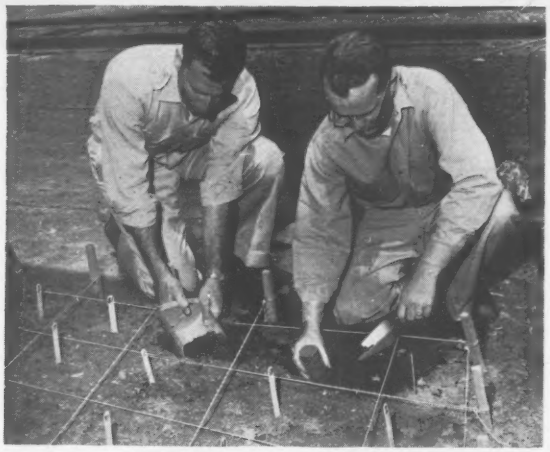
After thorough mixing, treated soil is compacted in a modified Vicksburg compactor to a 2 by 4 in. cylinder samples.



By burying in the ground, sample cylinders were given five months exposure to actual weather conditions.

through a fall of 12 in. onto a tamping foot 2 in. in diameter. Normally 12 such blows were applied to each of four 1 in. soil layers, forming a compacted cylinder 2 in. in diameter and 4 in. in height. Higher densities were achieved by doubling the number of blows per layer. The samples were measured, and then kept at 100% relative humidity and 20C until testing.

Testing consisted principally of immersing the specimens in water for 48 hours, draining briefly, measuring and breaking in unconfined compression. Other tests included volume change measurements and outdoor exposure of buried test cylinders during one winter and spring. All strength test results were recorded as psi required for sample failure.

After exposure, samples are broken in unconfined compression.

A clay soil having the characteristics shown in Table I slaked or failed completely when compacted at its optimum content, cured and immersed in water. The same soil treated with 2% phosphoric acid and cured five days had an immersed strength of 110 psi and less than 1% volume change. Curing two weeks raised the immersed strength to 150 psi and after one month about 200 psi was developed.

The immersed strength is dependent on the moisture content present at the time of molding. When .5% of Amine ODT is added, the immersed strength may be somewhat lower but less dependent on molding moisture content. Thus, control of moisture content is less critical when using the combination of phosphoric acid and Amine ODT.

The immersed strength of soil stabilized with phosphoric acid is dependent on the curing interval prior to immersion. Strength increases rapidly during the first week, somewhat slower during the next three weeks, and gradually thereafter. The presence of the amine will protect the prosphoric acid treated soil during the initial period due to the hydrophobic nature of the organic substituent. Higher strengths may be obtained by applying higher compactive efforts. For example, 240 psi immersed strength is developed using 24 blows per layer versus 150 psi obtained with 12 blows per layer.

• **Field Tests**—Several dozen samples were prepared and buried outdoors 3 in. below ground level at Everett, Mass. These were placed in November, 1956, and one-half removed in midwinter, the remainder in May, 1957. Untreated samples were reduced to a soft, mushy consistency, whereas the phosphoric acid treated samples resisted the exposure and gave strengths comparable to the immersed strengths found in the laboratory and reported above. Thus, the treatment affords a considerable degree of protection against wintering.

Laboratory tests on several samples representative of problem soils in two southern states are currently being carried out or have been completed. All of the soils thus far evaluated have responed favorably to the 2% phosphoric acid treatment and in all cases beneficial effects have been noted with additions of .5% or less of Amine ODT. These soils may be briefly identified as silty loam, clay loam, clay and a silty clay with P. I. values ranging from 8 to 28.

No major difficulties are forseen in the field application of this method. The construction procedure will be similar to the methods now employed with present commercially available stabilizers. A liquid composed of phosphoric acid, an amine, and water sufficient for proper compaction, will be fed from a tank truck to a spray bar integrally attached to a traveling mixer. The liquid will be sprayed into the soil as it is being pulverized and mixed by the machine. Mixing may be continued by subsequent passes of the machine until pulverization of the degree required in other stabilization methods is achieved. The mixed soil is then compacted by sheepsfoot rollers and smooth rollers, and the wearing surface applied.

In this method of construction the usual control tests will be required to insure proper liquid content and the specified degree of pulverization and compacted density.

(*Continued on page 106*)

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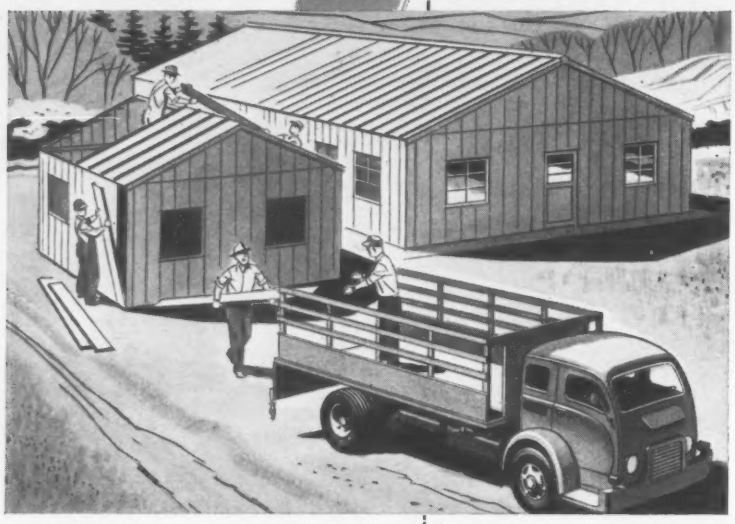

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• **Economies**–Since a small volume of high specific gravity liquid is being employed, the costs attendant to hauling and storage will be noticeably less than for presently used stabilizers. Due to the fact that the stabilizers can be added with the water in the traveling mixer, savings should be evident in the processing steps.

When the amine is used with the acid, further economies may be expected from the improved mixing characteristics which result from the combined treatment.

The use of higher percentages of phosphoric acid can result in stabilized soil of greater strength. However, Monsanto has concentrated on a range of about 2% phosphoric acid because the cost of the acid would then be competitive with the other soil stabilizers in the amounts required for heavy clays and the immersed strengths obtained are felt to be adequate for subgrade stabilization.

The development of phosphoric acid as a stabilizer for heavy clay soils in road building is still largely in the laboratory. It has been shown that phosphoric acid will stabilize plastic clay soils against the harmful effects of water. The combination of phosphoric acid with Amine ODT will stabilize clay soils over a wide range of moisture contents, and studies show that the treated soil will be easy to mix, compact and shape.

Further laboratory investigations are being conducted in close cooperation with state highway departments. This work is aimed at obtaining additional information necessary for the construction of test road strips. Thorough evaluation of the performance of the resulting test strips will determine the final judgment on this new method of road base construction.

The Physical Research Division of the Bureau of Public Roads in Washington, D. C., has provided information and test procedures as well as interest in the project.

River Flow Data Obtained With Radioactive Tracers

In a switch on the old "Forty-Niner" gold-panning technique, California Research Corp. scientists "salted" the American River near historic Sutter's Mill with radioactive gold to measure the volume of water flow in the fast-moving stream.

The measurement, which would have required several days to complete with conventional water flow apparatus, took less than two hours.

Originally designed for use in petroleum refineries and adapted to

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AT SITE OF '49 GOLD RUSH, gold radioistotope is dropped into American River and measured downstream with Geiger counter to determine river flow.

stream measurement, the new radioactive testing method is expected to find important applications in the planning of flood control and irrigation programs and in mapping watershed runoff.

Key to the new testing method is a gold isotope produced at Oak Ridge, Tenn.—the same isotope already widely used in medicine for cancer therapy.

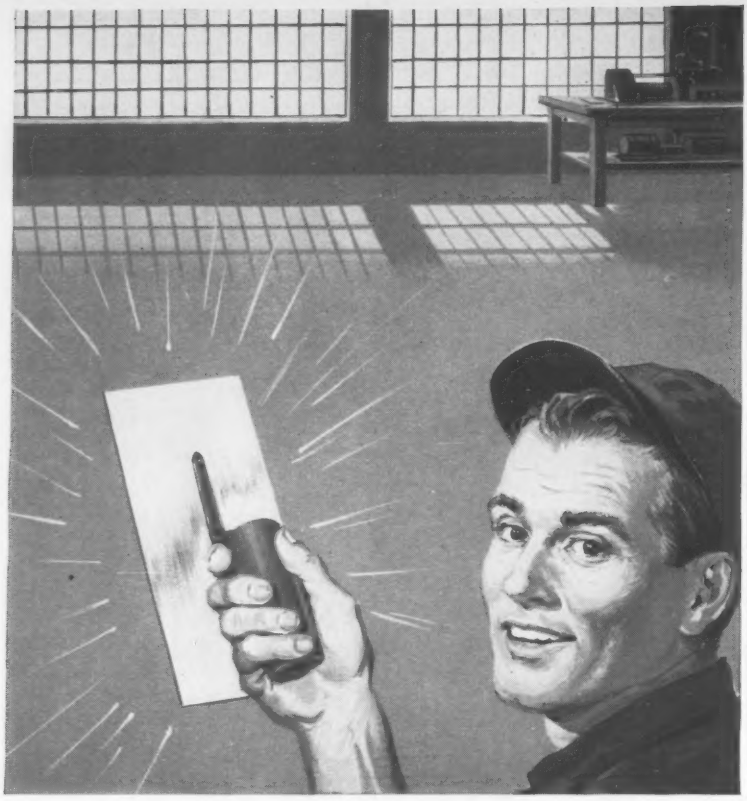
Here's how the system works:

First a solution of radioactive gold particles is dropped into the water. Then about a mile downstream, personnel "fish" for the passing gold with a Geiger counter. Calculations based on the number of Geiger counter clicks as the gold flows past disclose how many second-feet of water move past the point of measurement.

Previously tested under laboratory conditions indoors and on the small Navarro River 100 miles north of San Francisco, the system received its first big field test on the American River, which flows on the order of 1,000 cfs.

Dubbed the "total-count" method, the new technique promises to save time and labor in surveying water resources in regions not equipped with regular gaging stations, which require dams or weirs to gather water flow data.

A. L. Lyman, Cal Research president, explained during the tests that use of gold isotope eliminates any radiation hazard—gold loses its radioactivity in a few days compared to some metals which retain it for years. The research agency, a subsidiary of Standard Oil Co. of California, plans to make the technique and necessary instructions available for general use under license.



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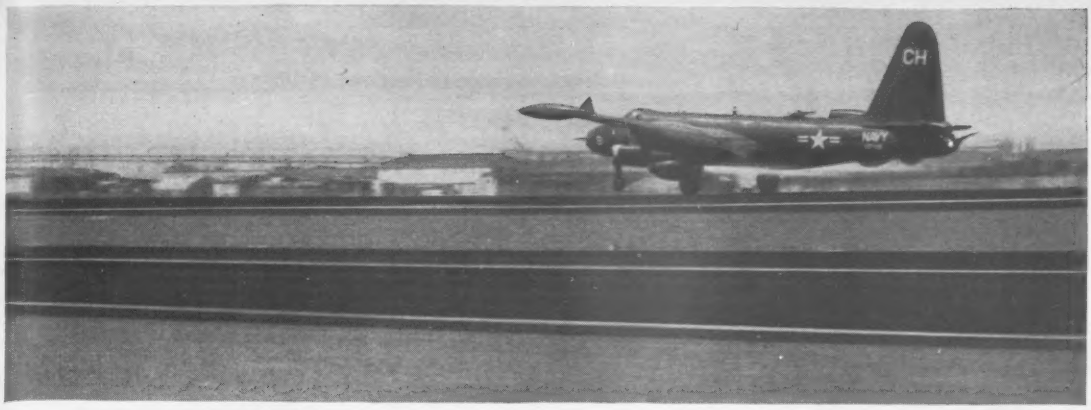
In London, England: **Industrial Asphalts Company, Ltd.**

†A Trademark of The Flintkote Company

FLINTKOTE INDUSTRIAL PRODUCTS

FLINTKOTE

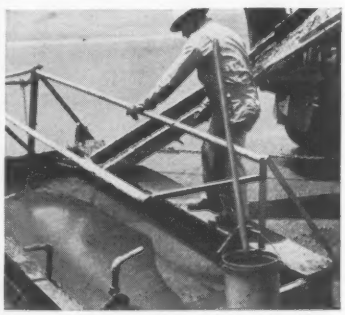
(Advertisement)



Navy gets double savings with Bitumuls Slurry Sealing of Runways at Jet Training Station

ONE of the busiest military air installations on the entire West Coast is the Alameda Naval Air Station. In addition to heavy traffic in propeller-driven aircraft, Alameda is an important West Coast jet aircraft training center.

Runway Construction—The runways of this Naval Air Station are surfaced with asphaltic concrete, placed over a 6" course of Bitumuls Sand Mix. The wide shoulders adjacent to these runways are also Bitumuls RS-1 Chip Seal. The surfacing was placed some four years ago, and recently showed signs of weathering. Close inspection disclosed some ravelling; minor hair-cracks on the surface; and some loose material. This loose material, while of little importance during the days of conventional-type aircraft, had become a major source of expense after jets started operating here. Sand, small stones, and other loose material can cause considerable damage, when scooped into the jet engines.



Bitumuls Slurry is chuted into spreader-box as mix-truck travels at speeds up to 5 MPH.

A Dual Problem—The Navy was looking for answers to two problems: First, a method of revitalizing the runways and extending the life of the pavement surface. Second, a means of cutting down the repair bills involved when jet engines were damaged by loose material scooped up from the surface of the runways. *They found a single answer to both these problems in Bitumuls Slurry Seal!*

Bitumuls Slurry Seal composed of fine, sharp aggregate, Bitumuls Mixing Grade emulsified asphalt and water, was mixed in transit-mix trucks to a free-flowing, slurry consistency. It was applied by the squeegee action of a spreader-box to 350,000 sq. yards of runway and taxi-way. Contract for this work was awarded to George Reed, a contractor from Modesto, California.

To offset the high abrasive action of the aircraft tires on landing, a dilute (3 to 1) Bitumuls tack coat was placed ahead of the Slurry Seal to insure maximum adhesion.

Fast-Fast Application—It was "business-as-usual" at the Air Station while this work was in progress. In spite of the additional requirement of the tack coat, Bitumuls Slurry Sealing reduced interference with air traffic to a minimum. Planes at the Station were able to taxi over the fresh seal coat four hours after application. Jet aircraft landed on the new seal 24 hours after application.

The costs involved in providing this new life for the existing runway pavement was considerably less than that of a normal seal coat application.

"Meanwhile, at the Hangar..." In the repair shops, an extra "bonus" economy will be realized because Bitumuls Slurry Seal has eliminated loose material from the runways. *The cost of mechanical repairs occasioned by the induction of foreign material through the jet engines is expected to be sharply reduced.*

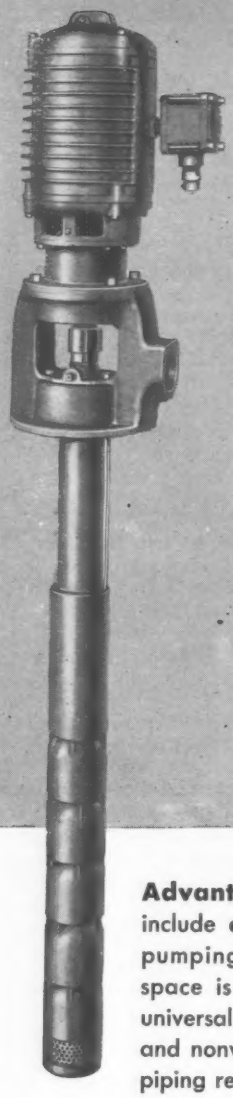
A Proved Procedure—Bitumuls® Slurry Seal has been proved on many installations—on highways, streets and airport runways—in terms of economy of initial application, and also in terms of durability. It can be applied in any quantity or volume for either construction or maintenance. Call our nearest office if you need additional information. It will be given gladly; and, of course, without obligation.

American Bitumuls & Asphalt Company

200 Bush St., San Francisco 20, California

Baltimore 3, Md. · Mobile, Ala. · Inglewood, Calif. · St. Louis 17, Mo. · San Juan 23, P. R. · Oakland 1, Calif. · Perth Amboy, N. J. · Cincinnati 38, Ohio · Tucson, Ariz. · Portland 8, Ore.

WIDE VARIETY OF LIQUIDS HANDLED BY DEMING INDUSTRIAL SOLVENT PUMPS



TYPICAL LIQUIDS HANDLED

Acetone	Hydraulic Oil
Acetone & Amiplene	Isopropyl Ether
Acetate-Acetone	Jet Fuel
Acetate Anhydride	Kerosene
Alkaline Solution	Lanolin
Ammonia	Methyl Ethyl Ketone Solvent
Amylene	Mineral Spirit
Anti-Freeze	Monoethanolamine
Aviation Gasoline	Octo Alcohol
Benzol	Pure Petroleum Naphtha
Benzine	Sea Water
Brines (Light)	Sodium Hydroxide Solution
Butanol	Solvesso
Caustic Soda	Styrene
Coconut Oil	Textile Finish Oil
Diesel Oil	Thinner
Ethanol	Toluene (Crude)
Ethyl Acetate	Toluene (Dry)
Ethyl Alcohol	Vinyl Acetate
Ethyl Ether	Xylene
Fuel Oil	
Hot Condensate	
Hot Paraffin	

Advantages of Deming Fig. 4703 pumps include elimination of priming difficulties as the pumping unit is always submerged; minimum space is required due to vertical construction; universal application for handling both volatile and nonvolatile liquids; no close clearances; less piping required; low maintenance and operating cost. For complete information, write to:

THE DEMING COMPANY
536 BROADWAY • SALEM, OHIO

Legal

Construction Defects

Courts vary on liability of architects, engineers

As a general rule, an architect or engineer is merely required to exercise ordinary skill and care in his work. If he does so, he is not liable in most jurisdictions for faults in construction resulting from defects in the plans. If he fails to exercise ordinary care and skill, however, he may not only be liable in damages for defects in his plans, but he cannot recover compensation for his services.

In an Oregon case,[1] however, an architect was allowed to recover compensation for his services despite the fact that a foundation, constructed in accordance with his specifications, failed to support the building because of the condition of the ground.

The court held that the architect did not give any guaranty as to the results of his plans and specifications. The evidence indicated that the architect exercised reasonable care and diligence in examining the site, in preparing the plans, and in supervising the work. Under these conditions, the court said, he was not liable for the defects that later developed.

Under the law of some states, architects and engineers are deemed to warrant, by implication, that their plans and specifications will accomplish the results desired. "It seems to be well settled that where a person holds himself out as specially qualified to perform work of a particular character, there is an implied warranty that the work which he undertakes shall be of proper workmanship and reasonable fitness for its intended use, and, if a party furnished specifications and plans for a contractor to follow in a construction job, he thereby impliedly warrants their sufficiency for the purpose in view. 17 C.J.S., Contracts, Section 329, page 781. These principles have been applied in building contracts. Minemount Realty Co., Inc. v. Ballentine, 11 N.J. Eq. 398; General Fireproofing Co. v. L. Wallace & Sons, 175 F. 650; Kennedy v. Bowling, 319 Mo. 401; also see Avent V. Proffitt, 109 S.C. 48, where an architect was held liable for failure to discover and condemn defective plastering in a house erected under his supervision."[2]

(1) White v. Pallay, 119 Or. 97, 247 P. 316.

(2) Hill v. Polar Pantries, 219 S.C. 263, 64 S.E. 2d 885.

Tru-Stop Brakes

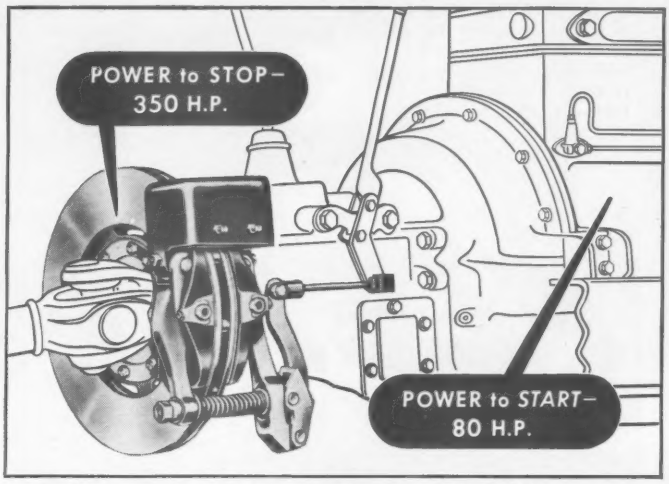
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

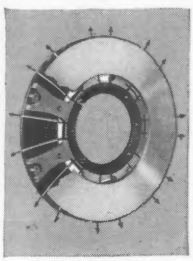
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

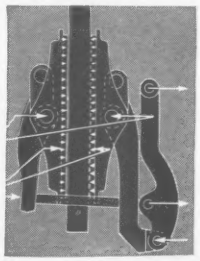


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.



Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

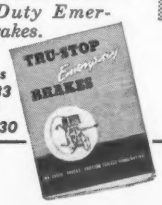
FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE

TRU-STOP Brakes are used on a great variety of mobile and stationary equipment

SUCH AS—

- Motor cranes
- Road rollers
- Dump trucks
- Power dividers
- Cooling tower fans
- Oil well pumps
- Cold header presses
- Scrubbing machines
- Wire rope stranders
- Fork lift trucks
- Motor scrapers
- Tractors
- Graders
- Diamond core drills
- Electric locomotives
- Oil well servicing rigs
- Railway inspection cars
- Shapers
- Power take-offs
- Winches
- Motor shovels
- Tractor loaders
- Conveyors
- Hard rock drill positioners
- Mine locomotives
- Power presses
- Railway power ballisters
- Cable tool spudders
- Aerial tram cars
- Tension wire stringers

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for Catalogs DH-33 and DH-530

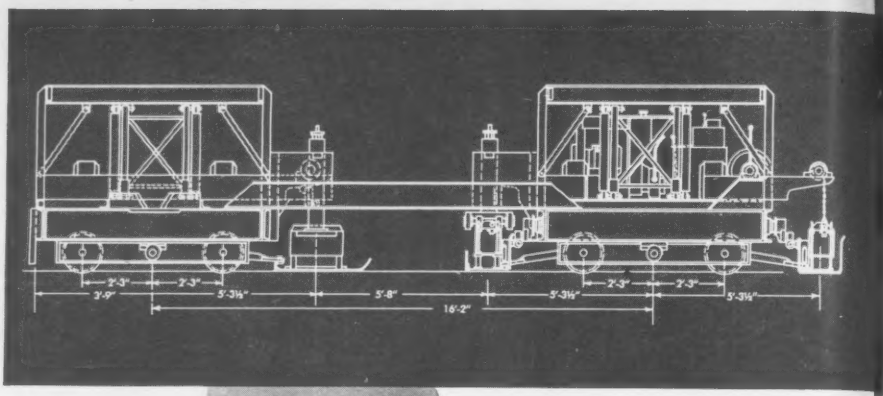


Automotive and Aircraft Division
AMERICAN CHAIN & CABLE

601 Stephenson Building, Detroit 2
2216 S. Garfield Street, Los Angeles 22 • Bridgeport 2, Conn.

ACCO
TRADE MARK

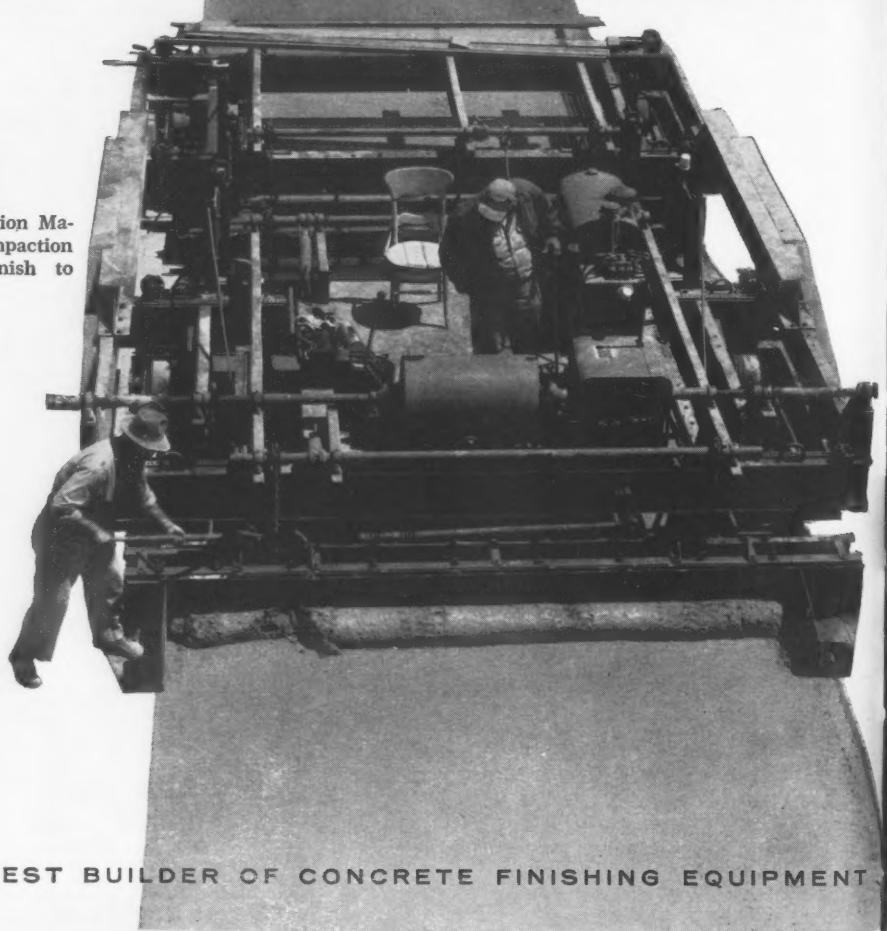
Two Detroit Special finishing machine frames engineered into one rugged unit combining finisher and float operation. Equipped with quick crown change screeds. Supplied in either 12' to 18' or 20' to 25' working widths. Hydraulically controlled pneumatic tired transportation assemblies optional.



FLEX-PLANE

First Again
with Faster — Finer — Finishing Combination

"FLEX-PLANE" Combination Machine gives greater compaction and applies superior finish to Connecticut Turnpike.



WORLD'S LARGEST BUILDER OF CONCRETE FINISHING EQUIPMENT

U. S. ROUTE 16—near Farmington, Michigan. Loselle Construction's Combination increases daily finishing average

". . . 4400 feet of 22-foot pavement finished in one day." . . . "keeps up with three dual drum pavers." . . . "450 lineal feet of 24′ pavement per hour." These are typical reports from contractors using the revolutionary new Flex-Plane Combination Finisher-Float Machine which does the combined jobs of transverse and longitudinal finishers. On the average, users finish over 3000 feet of pavement a day, requiring only two or three hand finishers depending on type of joints being used.

On-the-job checks show longitudinal surface smoothness to be unsurpassed by any other equipment regardless of condition of forms. Results prove it to be the fastest, most efficient finishing machine in use today.

But why not get all the facts? Write today for your copy of the data-packed "Flex-Plane Finisher-Float Machine" brochure. See for yourself why contractors consider it the finest machine of its type in the world.

36C

U. S. ROUTE 30—J. A. Jones Construction Company uses combination machine on straightaway paving—Flexplane self-widener on interchanges near Mansfield, Ohio.

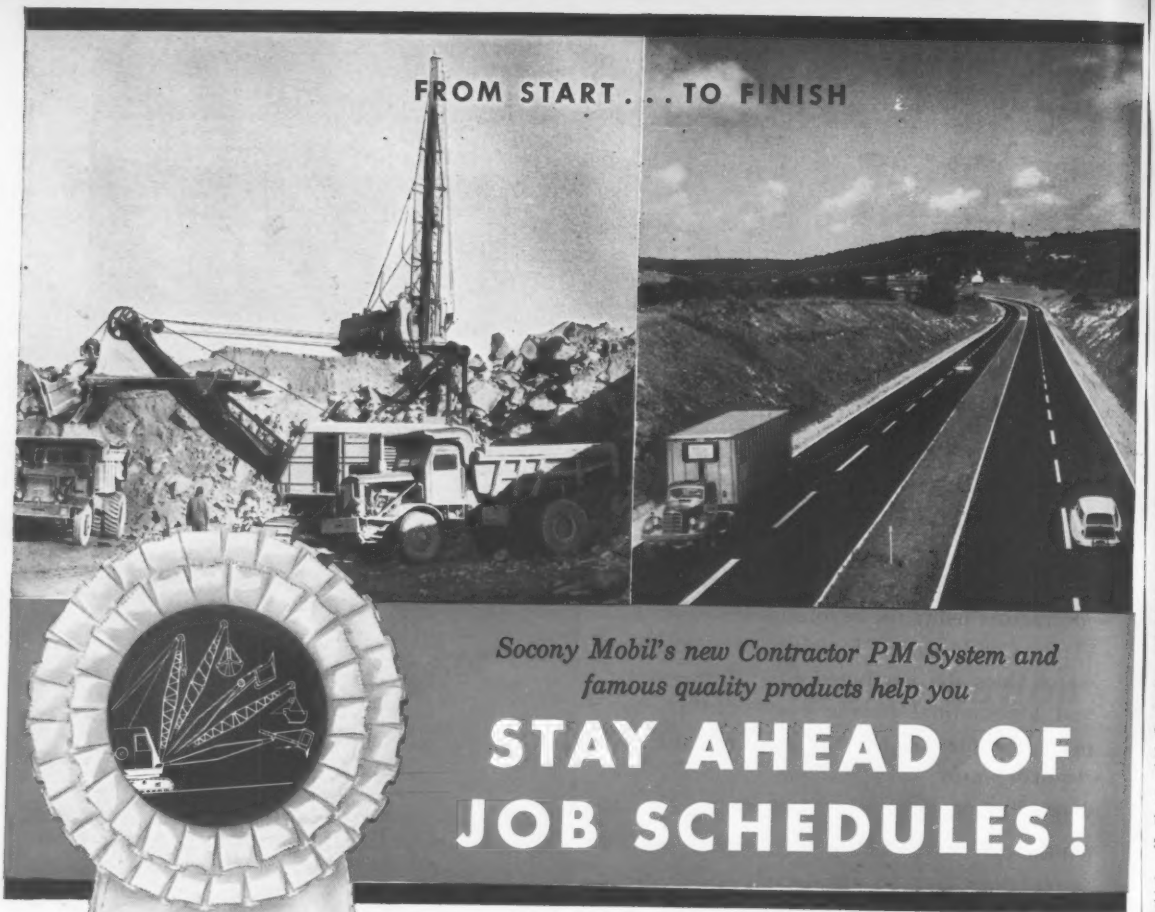
CONNECTICUT TURNPIKE—DeLillo Construction Company's Combination cuts hand finishing to a minimum.

U. S. ROUTE 12—Kalamazoo, Mich., bypass is worked by Carl Goodwin & Sons. Contractors generally report substantial savings over previous finishing methods.

U. S. ROUTE 23—Combination Machine owned by Denton Construction Company keeps up with three dual drum pavers south of Brighton, Michigan.

THE FLEXIBLE ROAD JOINT MACHINE COMPANY

520 THOMAS RD., WARREN, OHIO



Socony Mobil's new Contractor PM System and famous quality products help you

STAY AHEAD OF JOB SCHEDULES!

Contractor PM System Includes:

1. Record Folder—provides identifying data for each piece of equipment, holds equipment records.
2. Operator's Recommendation Chart—lists the correct lubrication recommendations for each piece of equipment.
3. Weekly Service & Inspection Report—an up-to-date record of mechanical condition of equipment, work to be done or completed.
4. Delivery Ticket—lists petroleum supplies delivered to equipment on the job.
5. "Squawk" Sheet—used by equipment operator to point out trouble spots that need attention.

Tough job ahead? You'll make it a whole lot easier when you use Socony Mobil's simplified Contractor PM System and these top-quality Mobil products:

Famous Delvac Oils—for all gasoline and automotive Diesel engines.

New Mobilube GX—multipurpose-type gear lubricant for enclosed gears—manually operated transmissions, transfer cases, final drives.

Versatile Mobilgrease MP—multipurpose-type chassis and wheel-bearing grease for all types of equipment.

These top-grade Mobil products plus the practical Contractors PM System are a part of Socony Mobil's Correct Lubrication Program which also includes:

Lubrication Engineering Service covering analysis, advice and use of Socony Mobil's outstanding technical know-how.

Mobil **SOCONY MOBIL**

Leader in lubrication for over 91 years

Correct Lubrication

A PROVED PROGRAM TO REDUCE EQUIPMENT MAINTENANCE COSTS

SOCONY MOBIL OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

Men and Jobs

Careers

Government

M. F. Thomas is new chief of the technical engineering branch of North Pacific Divisions, Corps of Engineers, in Portland, Ore. He succeeds **B. P. Thomas,** who resigns to enter private engineering practice.

Walter A. Lyon joins the Pennsylvania State Department of Health as a sanitary engineer.

Lt. Col. Max McCord becomes executive officer of the Louisville District, Army Corps of Engineers, replacing **Lt. Col. G. R. Taylor,** who is assigned to Fort Belvoir, Va.

Julius R. Jensen has been appointed director of the new Oregon planning and development department. Mr. Jensen has been director of the Seattle Industrial Expansion Association.

H. Earl Parker, Marysville general contractor, has been named chairman of the California State Contractors Licensing Board. He has been a board member since 1952. The new post brings him to the head of an organization that has disciplinary powers over the 79,568 contractors registered in the state.

Charles Laberge is appointed Deputy Minister of Public Works of Quebec. He also will serve in the capacity of consulting engineer for the Public Works Department.

Robert J. Kimley, city traffic engineer for Greensboro, N. C., for the past six years, has become head of advanced planning and programming for the North Carolina Highway Department, with headquarters at Raleigh. A civil engineering graduate of North Carolina State College, Mr. Kimley will work under Willard E. Babcock, recently appointed Director of Highways for the State.

Robert L. Jaffee has been appointed to the position of traffic engineer for Santa Clara, Calif.

Horace Williams, road plans engineer for the Montana State Highway Department since 1942, has stepped into a newly created job of programming engineer.

R. C. Fargo, Glasgow, Mont., city engineer, has resigned to accept a similar job at Havre.

John D. Wheeler, a right-of-way agent for the Montana Highway Department, has become secretary of the Montana Highway Commission, succeeding **C. E. Cunningham,** who resigned at the end of July.

Earl C. Hubbard is appointed head of the Division of Water Pollution Control of North Carolina Board of Health. He also continues to serve as executive secretary of the state's Stream Sanitation Committee.

Honors

Philip C. Rutledge of the consulting firm of Moran, Proctor, Mueser & Rutledge, New York City, has been awarded an honorary degree of Doctor of Engineering by Purdue University. Mr. Rutledge, an authority on soils mechanics and foundations, taught at Purdue from 1937 to 1942. A graduate of Harvard University, he holds an academic doctor's degree from that school and a master's degree from Massachusetts Institute of Technology.

Retirements

Andrew B. Hargis retires after 25 years at the University of Mississippi as professor of civil engineering. For his first five years at the school, he was dean of the school of engineering. He will engage in some consulting work, with offices at University, Miss.

Associations

Richard F. Donovan is elected president of the South Carolina Society for Professional Engineers.

Business

W. H. Corddry was elected president of Gannett, Fleming, Corddry & Carpenter, Inc., Consulting Engineers of Harrisburg, Pa. He succeeds **Farley Gannett,** who was named chairman of the board.

Russell Field, Wylie F. Nance and **David L. Narver, Jr.,** were appointed assistant vice presidents of Holmes & Narver, Inc., Contractors and Engineers of Los Angeles.

David O. McKinley has been elected vice president of Aberthaw Construction Co., Boston.

Ralph P. Fredrickson has joined the consulting firm of K. M. Clark Engineering Co., Minneapolis.

Simmerson & Bell, Consulting Engineers, Jacksonville, Fla., and **K. C. Mock & Associates,** Engineers and Surveyors, Palm Beach, Fla., have joined in the opening of an office at Palm Beach.

E. Todd Wheeler, architect, and **Perkins & Will,** Architects-Engineers, Chicago, and White Plains, N. Y., have associated to offer consulting and engineering service in hospital construction.

William T. Hill and **John T. Percy** have formed a partnership under the firm name of Hill & Percy, Engineers, in Dalton, Mass.

Lower Construction Costs with Factory-Built

UTILITY BUILDINGS

30' x 100' Building

Save on Original Cost, Erection, Reuse and Resale Value!

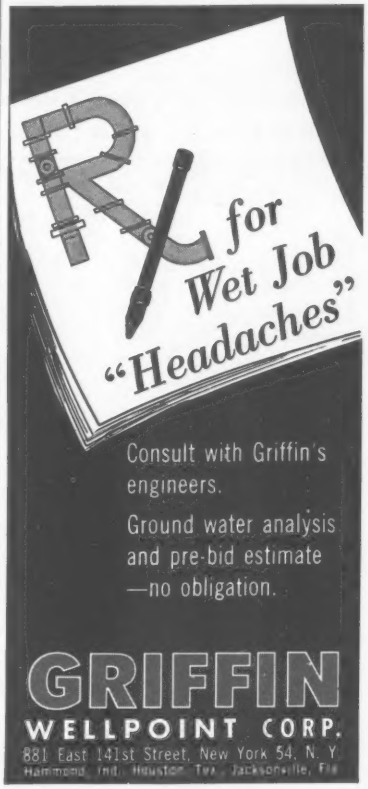
Storage or temporary housing—field offices, tool sheds or workshops—there's an attractive, functional ECONOMY Utility Building available for any requirement in a variety of designs and sizes from 6' x 8' to an extensible 30' x 250' and up. Constructed in sections of kiln-dried, tongued and grooved west-coast lumber. Quick to assemble, dismantle, transport. Can be extended at any time. Delivered complete—exterior painted. Used by many of the nation's most successful construction firms. Readily adaptable to special requirements.

7½' x 16' Mobile Building

ECONOMY BUILDINGS INC.

(SINCE 1922)

Dept. G-10 West Chicago, Illinois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Consult with Griffin's engineers.
Ground water analysis and pre-bid estimate —no obligation.
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Materials and Labor Prices

Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, July 18: Next Aug. 22
- Clay Products, Lime, Plaster, Paint; Roofing: Last, July 25; Next, Aug. 29
- Wage Rates, Building Board, Lath, Insulation: Last, Aug. 1; Next Aug. 29
- Cement, Aggregate, Ready-Mixed Concrete, Asphalt: Last, Aug. 8; Next, Sept. 5

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES—	PLATE CARBON STEEL	REINF BARS* billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$5.275	$5.10	$5.425	$12.25	.....	$110.50	$130.00	$6.975	$9.75	$6.60	.....
Chicago Area	5.275	5.10	5.425	12.25	$6.225	110.50	130.00	6.975	9.75	6.60	.....
Pittsburgh Area	5.275	5.10	5.425	12.25	6.225	110.50	130.00	6.975	9.75	6.60	$14.75
Buffalo Area	5.275	5.10	5.425	12.25	6.225	110.50	130.00	6.975	9.75	6.60	14.75
Cleveland	.....	.....	5.425	12.25	6.225	.....	.....	.....	.....	.....	14.75
Youngstown Area	.....	.....	5.425	.....	.....	.....	.....	.....	9.75	.....	.....
Geneva	5.275	5.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	5.975	.....	6.125	.....	6.225	.....	.....	.....	9.75	6.75	.....
Pueblo	.....	.....	.....	.....	.....	.....	.....	69.75	9.75	6.60	.....

* Fairless Works, $5.575.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot Rail steel	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq ft., carload lots fob mill
Atlanta	$8.74	9.25	$8.43[e]	$52.00	$57.00	
Baltimore	8.67	8.10[j]	....	42.00	46.50	
Birmingham	8.64[t]	8.60[t]	8.60[t]	66.25[p]	71.00[p]	
Boston	9.59[a]	8.25	8.25	47.50	51.00	
Chicago	8.79	6.91[gu]	6.91[gu]	52.00‡	63.00‡	
Cincinnati	8.89[ak]	8.43[rs]	....	43.50[mn]	48.00[mn]	
Cleveland	9.01	6.89[c]	....	44.50‡	49.00‡	
Dallas	10.25	8.85	8.85	61.00	66.50	
Denver	9.80	8.45[c]	....	57.00[n]	63.00[n]	
Detroit	9.15	7.75[d]	....	45.00	49.50	
Kansas City	9.31[a]	8.10	....	49.00	60.00	
Los Angeles	9.35[fd]	7.35	....	58.50	64.50	
Minneapolis	8.56[d]	8.91[b]	8.91[b]	41.50	46.00	
Montreal	8.25–900[c]/8.30–8.70[A]	7.75/9.95[i]	7.75/9.95[i]	65.00[k]	70.20[k]	
New Orleans	....	7.70[gks]	....	45.50	50.00	
New York	9.15[s]	8.15[dy]	8.15[dy]	50.50[n]	57.00[mo]	
Philadelphia	8.04	7.14	....	42.50‡	47.00‡	
Pittsburgh	8.64[t]	6.75[t]	....	46.00‡[W]	49.50‡[W]	
St. Louis	9.10[e]	8.45[c]	8.05[c]	61.00[l]	62.00[l]	
San Francisco	9.50	9.45[j]	....	51.00	54.00	
Seattle	9.80[d]	8.85[e]	....	62.00[nr]	68.00[nr]	
Toronto	8.75*	7.60	7.60	59.50[nq]	62.75[nq]	

EXTRAS, per cwt—◆Quantity (applies to LCL shipments only): under 1,000#, +$1.80; 1000–1999#, +$1.50; 2000–4999#, +$1.20; 5000–9999#, +90¢; 10,000–19,999#, +60¢; 20,000–29,999#, +30¢; 30,000–39,999#, +10¢; 40,000# & up, none. ◆Size†: #2 +$2.50; #3 +$1.40; #4 +$1.00; #5 +70¢; #6, #7, #8, #9, #10, #11 +50¢. ◆Bending: heavy, +60¢; light +$2.20 (except in New York City and surrounding metropolitan area where bending must be done on the job). ◆Engineering (details and placing from designs by others): over 500 tons, +45¢; 200–499 tons, +50¢ but not over $1500; 75–199 tons, +65¢ but not over $2000; 20–74 tons, +75¢ but not over $975; 5–19 tons, +85¢ but not over $300; under 5 tons, +$1.00 but not over $65. Min. charge $25. Design only: +60¢.

Quantity extras, per cwt: under 100#, +$3; 100–399#, +$1.80; 400–999#, +$1.50; 1000–1999#, +$1.00; 2000–4999#, base price; 5000–9999#, —10¢; 10,000–19,999#, —20¢; 20,000–29,999#, —50¢; 30,000# and up, —70¢

WELDED FABRIC REINFORCING Per 100 sq ft., carload lots fob mill

4 × 16 in., No. 5 & 10 wire— Joliet, Ill., Donora, Pa., Monessen, Pa.: $3.98

4 × 12 in., No. 8 & 12 wire— Joliet, Ill., Donora, Pa., Monessen, Pa.: $3.62

6 × 6 in., No. 6 & 8 wire— Joliet, Ill., Donora, Pa., Monessen, Pa.: $4.17

*‡ Delivered. **Aver. of Canadian & American. *a 2000–9999#. *b 10,000–15,999#, fob city *c 20 tons or over *d 10,000–19,999#. *e Intermediate struct'l *f Incl. delivering in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add dominion, provincial and municipal sales taxes *j intermediate and hard grade *k fob city *l delivered; contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p del. of 500 sq. yd. or more. *q 3 lb *r 2% off for cash *s 2,000–4,999# *t add 15¢ del. *u add 6.25¢ switch *v incl 15¢ del. *w truck lots. *x add 5¢ switch *y add 35¢ del. *z add 10¢ del. *A American made. *C Canadian made. *D ½% for cash.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEX*a	ASBESTOS CEMENT PIPE per lin. ft. f.o.b. city 6" Pr Cl. 150	ASBESTOS CEMENT PIPE per lin. ft. f.o.b. city 12" Sew Cl. I	CLAY SEWER PIPE Per ft., delivered ASTM C13-55 24 in. 8 in.	CLAY SEWER PIPE Per ft., delivered ASTM C13-55 36 in. 12 in.	CLAY SEWER PIPE Per ft., delivered ASTM C200-55T 6 in. 24 in.	CLAY SEWER PIPE Per ft., delivered ASTM C200-55T 8 in. 36 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTM C4-55 6 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTM C4-55 8 in.	CONCRETE SEWER PIPE§ Per ft., delivered ASTMC 14-55 12 in.	CONCRETE SEWER PIPE§ Per ft., delivered ASTMC 14-55 24 in.
Atlanta	123.7	$1.64	$2.68	$.58	$1.00	$4.40	$14.50	$277.00[s]	.....	$1.55[m]	$4.40[m]
Baltimore	133.3	1.64	2.48	.665	1.28	5.08[s]	12.71	187.80	$289.20	1.01	2.75[m]
Birmingham	119.0	1.64	2.68	.46	.86	3.70[sw]	10.37[w]	260.00‡	440.00‡	1.25[m]	2.75
Boston	136.2	1.66	2.46	.812[qri]	1.566[qri]	6.525[qri]	.....	215.40[r]	330.60[r]	1.56[mq]	3.47[mq]
Chicago	134.1	1.64	2.46	.93[m]	1.78[m]	7.52[m]	21.16[m]	220.00[n]	330.00[n]	1.30	4.00
Cincinnati	128.7	1.66	2.55	.565[t]	1.282[5]t	4.905[t]	12.505	240.00	370.00	.85[m]	3.25[m]
Cleveland	134.9	1. 66	2.55	.595[s]	1.1475[s]	4.725[t]	12.4025[t]	155.40[m]	240.60[m]	.85[m]	3.50[m]
Dallas	131.0	1. 66	2.80	.439	.709	4.00[b]	9.17[b]	.....	....	1.04	2.10
Denver	141.4	1. 73	2.80	.47[n]	.84[n]	3.73[n]	.....	.....	....	.75[m]	2.75[m]
Detroit	135.3	1.66	2.55	.90[n]	1.70[n]	6.80[n]	18.60[n]	164.80[m]	254.20[m]	1.10	3.82
Kansas City	131.7	1.66	2.55	.61	1.105	4.47	11.56	275.00	485.00	.85	3.00
Los Angeles	141.8	1.73	2.46	.74[l]	1.61[l]	6.42[l]	15.36[l]	360.00[l]	530.00[l]	1.12	3.32[f]
Minneapolis	143.1	1.68	2.68	.86[mo]	1.55[mo]	6.70[mo]	.....	.....	.....	1.76[h]	4.74[h]
Montreal	.....	....	....	1.07[u]	1.90[u]	6.80[u]	12.50[u]	288.00	545.00	1.17[h]	3.11[j]
New Orleans	136.5	1.64	2.68	.528	.983	5.10	.....	210.50[p]	468.00[#]	.85	2.90
New York	131.7	1.66	2.46	1.02	1.94	7.56	19.48	.....	.....	1.80	3.00
Philadelphia	131.0	1.64	2.46	.65	1.25	4.95[s]	12.65[s]	300.00‡	350.00‡	1.60[h]	3.95[h]
Pittsburgh	136.1	1.66	2.46	.595[m]	1.15[m]	4.73[m]	12.40[m]	190.00	295.00	1.45[z]	3.50[z]
St. Louis	130.1	1.64	2.55	.59	1.08	4.45	10.80	180.00[l]	380.00[l]	1.45[il]	3.10[kl]
San Francisco	141.8	1.73	2.46	.78[d]	1.69[d]	6.72[d]	16.36[d]	320.00[l]	560.00[l]	1.05[m]	3.30[m]
Seattle	142.2	1.73	2.46	.67[b]	1.33[b]	6.84	.....	220.00[c]	.....	1.10[k]	3.25[k]
Toronto	.....	....	....	.76	1.425	6.00	.....	157.00	280.00	1.02	3.57

*WROUGHT STEEL PIPE (Full standard weight) Discount from list; see footnote

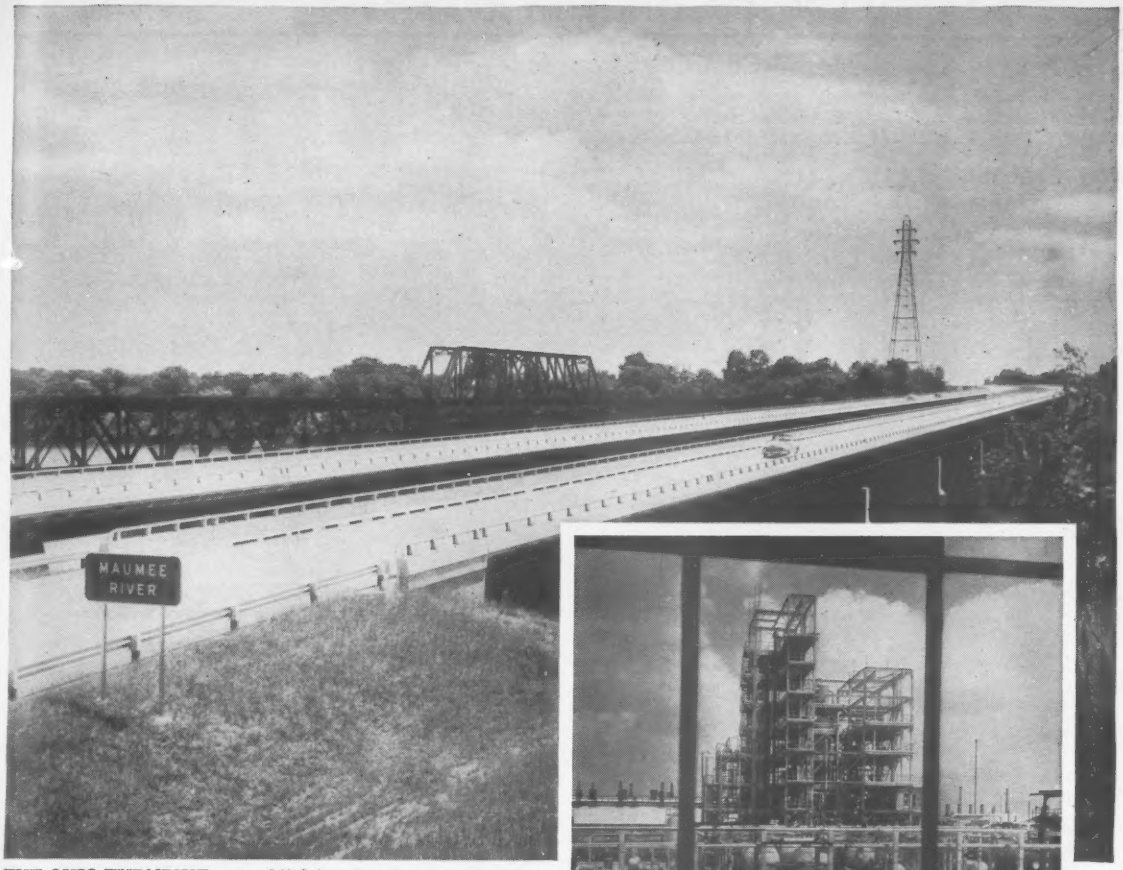
Mill	Butt Weld 2½ & 3 in. Black %	Butt Weld 2½ & 3 in. Galv. %	Lap Weld 3½ to 6 in. Black %	Lap Weld 3½ to 6 in. Galv. %	Butt Weld—1 in. Black %	Butt Weld—1 in. Galv. %	Lap Weld 1¼ to 3 in. Black %	Lap Weld 1¼ to 3 in. Galv. %	Lap Weld 3½ in. %	Lap Weld 4 in. %	Lap Weld 4½ in. %	Lap Weld 5 in. %	Lap Weld 6 in. %	Lap Weld 7 in. %	Lap Weld 8 in. %	Lap Weld 9 in. %	Lap Weld 10 in. %	Lap Weld 11 in. %	Lap Weld 12 in. %
Lorain, Ohio	16.75	0.50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Aliquippa, Pa.	16.75	0.50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sparrows Pt., Md.	14.75	1.50	0.25[s]	+8.00[s]	0.25[s]	+8.00[s]	0.25[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]	+8.00[s]
Benwood, W. Va.	16.75	0.50	0.25	+5.25[s]	0.25	+5.25[s]	0.25	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]	+5.25[s]
Youngstown, O.	16.75	0.50	10.50[ab]	+11.50[s]	10.50[ab]	+11.50[s]	10.50[ab]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]	+11.50[s]
Indiana Harbor, Ind.	15.25	0.50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sharon, Pa.	16.75	0.50	6.25[s]	+10.50[s]	6.25[s]	+10.50[s]	6.25[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]	+10.50[s]
Wheatland, Pa.	16.75	3.00	4.50[d]	+9.75[d]	4.50[d]	+9.75[d]	4.50[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]
Etna, Pa.	16.75	3.00	4.50[d]	+9.75[d]	4.50[d]	+9.75[d]	4.50[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]	+9.75[d]
Fontana, Calif.	3.25	+13.00	+7.25[ab]	+24.00[ab]	+7.25[ab]	+24.00[ab]	+7.25[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]	+24.00[ab]

†Threaded and coupled. weld. 5 and 6 in. a 3½ to 4 in. d 6 in. b Continuous

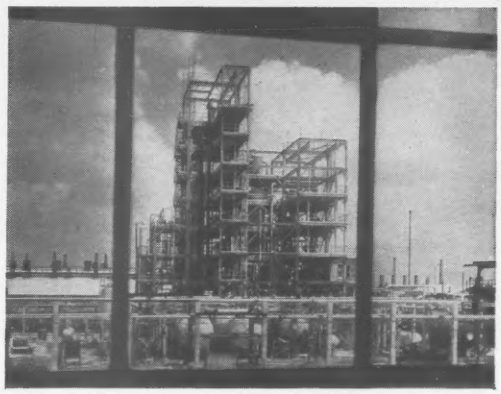
*† Extra quality *§ extra strength. *‡ delivered. *a PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 119.0; Burlington, N. J., 127.8. *b Extra strength. *c 4-in., $130. *d SS361-A *e 30-in. *f 21 in. *g culvert pipe; reinf., ASTM C 75–56 *h reinf., ASTM C 75–54 *i reinf., ASTM C 76–54 *j centrispun; no standard specs. in Canada. *k 2% cash *l fob plant *m truck del. *n LCL del., fob truck *o listed price based on LCL (no min.) *p freight allowed to destination in city *q ASTM C 13–40 *r CL fob origin, freight allowed *s 2 ft lengths *t 3 ft lengths *u CESA A 60–1941 *v standard strength *w SS; add 20% for d.s. *x fob city # correction

* WROUGHT STEEL PIPE: Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft.(*based on approx. $200 per net ton): Butt Weld ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. Lap Weld 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight, 3% transport tax for destination price.

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: Butt Weld—1 in. black, + 65.54, galv. + 95.77; 1¼ in. black, + 66.54, galv. + 95.23, 1½ in. black, + 61.79 galv. + 91.22; Lap Weld —2½ in. to 3 in. black + 67.95 galv. + 95 77; 4½ in. to 6 in. black + 64.74 galv. + 90.68 Add freight rates plus 3% transportation tax to get destination price.



THE OHIO TURNPIKE, central link in a 3-state system, crosses the Maumee River near Toledo. Red lead paint was specified for all bridges by the Ohio Turnpike Commission, Pennsylvania Turnpike Commission, and Indiana Toll Road Commission.



RED LEAD primers provide outstanding protection for steel even under the most rigorous industrial exposures.

RED LEAD Keeps America's Superhighways Fit For The Future!

Whether we call them Thruways, Turnpikes, Parkways or Freeways, each link in our growing system of superhighways will someday form a country-wide network of speedy convenience for American motorists.

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RELY ON RED LEAD—THE STANDARD FOR STEEL PROTECTION

Lead Industries Association

60 East 42nd Street New York 17, N. Y.

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
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J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

Conn., Stratford—BA 8/22—Avco Mfg. Corp., Lycoming Div., 550 S. Main St., industrial waste treatment and disposal plant. $500,000. Albright & Friel, Inc., Penn Center Plaza, Phila., Pa., engr.

† **Connecticut**—BA On or About 8/27—U.S. Eng., 150 Causeway St., Boston 14, Mass., railroad relocation (initial contract) Thomaston Dam and Reservoir; Thomaston, CIVENG-19-016-58-9. CD 1/31.

BUILDINGS—BA

Conn., Seymour—HOUSING—BA 8/21—Seymour Housing Auth., 34 Second St., 13 bldgs., 26 units, moderate rental housing, Chamberlain Rd. $605,000. Jerome F. Mueller, 15 Lewis St., Hartford, engr. Olson & Miller, 642 Asylum Ave., Hartford, archts. CD 5/16.

Conn., Storrs—COMMONS—BA 8/21—State P. Wks. Monr., 165 Capitol Ave., Hartford, Proj. BI-D-205A, commons bldg., University of Connecticut, $600,000. Plans deposit $40. Urbahn, Brayton & Burrows, 654 Madison Ave., New York, N. Y., archts.

Mass., Newton—TEMPLE—BA 8/23-Temple Reylm, 521 Chestnut St.,(selected list bidders). temple, 1860 Washington St. $350,000. Plans deposit $15. The Architects Collaborative, 63 Brattle St., Cambridge, archts. CD 10/1.

HEAVY CONSTRUCTION—LB & CA

MAINE—State Hy. Comn., Augusta, Bids opened 7/24, **George C. Hall**, Old County Road, Rockland, Me., LB $344,839. (5 bidders), b. conc. 2.494 mi., incl., bridge. FASP No. S-0112(4), Biddeford Co.

MAINE—State Hy. Comn., Augusta,
W. H. Hinman, Inc., North Anson, Me., CA $344,934 (2 bidders), b. conc. 6.817 mi. FAP No. F-015-1(9), Monmouth and Winthrop Counties. Bids July 24.

MAINE—State Hy. Comn., Augusta,
Me.—**Thomas DiCenzo**, Calais, Me., CA $126,738 (2 bidders), b. conc. 4.441 mi. FASP S-0276(5) and SP 287(502) Sebec and Milo Counties;
Me.—**Wyman & Simpson, Inc.**, Augusta, Me., CA $98,805 (7 bidders), 0.473 mi. bit. grav. road incl. bridge, SP 728(510) and No. 3261, Dallas Plantation. Bids July 31.

NEW HAMPSHIRE—State Dpt. P. Wks. & Hys., Concord,
Thomas W. Watkins & Son, Inc., 79 Elm St., Amesbury, Mass., LB $135,296, surf. tr. grav. roadway, 2.046 mi. N. H. 108, Plaistow. Bids July 26. CD 7/26.

Arthur Whitcomb, Inc., 725 Main St., Keene, N. H., LB $74,000. sewers in Maple Ave., KEENE, N. H. City, City Hall, Keene, N. H. Bids July 29. CD 7/19.

Samuel Aceto & Co., 40 Preble St., Portland, Me., CA $137,170, laying water mains, constr. vacuum pump bldg., etc., MONTPELIER, VT. City, City Hall, Montpelier, Vt. Bids July 18. CD 7/24, under LB.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 7/23,
Campanella & Cardi Constr. Co., 780 Jefferson Blvd., Hillsgrove, R. I., CA $3,392,324, est. $3,585,922, relocate Rte. No. 28, in Reading, Woburn, Wilmington. CD 7/26, under LB.

† **Perini Corp.**, 73 Montwait Ave., Framingham, Mass., CA $966,278, major repairs to Runways 11-290, IFB-19-604-57-180, L. G. Hanscom Air Field, BEDFORD, MASS. U.S.A. Headquarters Air Force Cambridge Research Center, L. G. Hanscom Air Field, Bedford, Mass. Bids July 12. CD 7/17, under LB.

Nyland Corp., 489 5th Ave., New York, N. Y., CA $170,900, est. $170,000. Contr. B, incinerator addns. and appurtenances, NEW BEDFORD, MASS. City, Supt. Bldgs., Municipal Bldg., New Bedford, Mass. Bids June 28. CD 7/9, under LB.

CONNECTICUT—State Hy. Comn., 165 Capitol Ave., Hartford,
Kement Constr. Co., Broad Brook, Conn., LB $80,176 (6 bidders), Proj. 48-81, b. conc. 1,003 lin. ft. Main and North Main Sts., Route 190, Thompsonville. CD 7/24.

CONNECTICUT—State Hy. Comn., State Office Bldg,, 165 Capitol Ave., Hartford,
Charter Oak Constr. Co., Inc., 525 Main St., Hartford, Conn., LB $348,673 (11 bidders) Proj. 29-57 bit. macadam. 6,921 lin. ft. 6 sections, Rte. 183, incl. 2 concrete girder bridges over Sandy Brook, Colebrook and Norfolk. Bids July 29. CD 7/22.

▲ **Brunalli Constr. Co.**, 109 Summer St., Southington, Conn., CA $1,241,885. sub-structure for Glastonbury-Wethersfield Bridge across Connecticut River, 13 piers, 2 abutments, Glastonbury and Wethersfield, HARTFORD, CONN. Greater Hartford Bridge Auth., 71 Capitol Ave., Hartford, Conn. Bids July 18. CD 7/22, under LB.

▲ **White Oak Excavators, Inc.**, 61 E. Main St., Plainville, Conn., CA $1,733,988. grading east approach to Glastonbury-Wethersfield Bridge over Connecticut River, Glastonbury, HARTFORD, CONN. Hartford Bridge Auth., 11 Asylum St., Hartford, Conn. Bids July 24. CD 7/26, under LB.

City, 200 Orange St., New Haven, Conn., rejected bids July 12, primary digester and appurtenances, Boulevard Treatment Plant, NEW HAVEN, CONN. LB $302,616. New bids 8/5. CD 7/17, under LB.

Forestville Constr. Co., 24 Bernie Ave., Forestville, Conn., LB $75,350. (7 bidders) sanitary sewers, 3,600 ft. 18 in. tile pipe, 1,310 ft. 10 in. c. i. pipe, appurtenances, Migeon Ave., in West branch of Naugatuck River, TORRINGTON, CONN. City, City Hall, Torrington, Conn. Bids July 25. CD 7/16.

▲ **Wexler Constr. Co. & Gil Wyner Co., Inc.**, Newland St., Malden, Mass., LB $1,251,000. (3 bidders) utilities and buildings, WINDSOR, CONN. Combustion Engineering, Inc., Reactor Development Div., Central Ave., Windsor, Conn. Hayden, Harding & Buchanan, 1340 Soldiers Field Rd., Brighton, Mass., engrs.

BUILDINGS—LB & CA

▲ **Perk Constr. Co.**, 40 Court St., Boston, Mass., LB $2,087,000, est. $2,300,000, SENIOR HIGH SCHOOL, DEDHAM, MASS. Town, School Bldg. Comn., supt. Schools, Bryant St., Dedham, Mass. CD 11/28.

▲ **Perini Corp.**, 73 Montwait Ave., Framingham, Mass., LB $5,500,000. PLANT exten., NORTH ANDOVER, MASS. Western Electric Co., Inc., 195 Broadway, New York, N. Y. Bids June 18. CD 6/4.

▲ **Giordano Constr. Co.**, 287 Main St., Branford, Conn., CA $1,011,595. HIGH SCHOOL, GUILFORD, CONN. Town, Town Hall, Guilford, Conn. Bids June 17. CD 7/8, under LB.

A. F. Peaslee, Inc., 37 Lewis St., Hartford, Conn., CA $823,389, 1 story, steel, masonry HIGH SCHOOL, Ninth Dist. Rd., SOMERS, CONN. Town, Town Hall, Somers, Conn. Bids June 18, awarded July 29. CD 6/11.

Associated Constr. Co., 1010 Wethersfield Ave., Hartford, Conn., LB $588,000 (13 bidders) Proj. BI-D-201A, POULTRY SCIENCE BLDG., University of Connecticut, STORES, CONN. State P. Wks. Dpt., 165 Capitol Ave., Hartford, Conn. Bids July 31. CD 7/19.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England	**Middle West**
Middle Atlantic	**West of Mississippi**
South	**Far West**

PROPOSED WORK

Water Supply	**Public Buildings**
Sewers, Waste Disposal	**Mass Housing**
Bridges	**Commercial Buildings**
Streets & Roads	**Industrial Buildings**
Earthwork, Waterways	**Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.
CD dates shown are of Construction Daily Issue in which last previous report was published.
OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily
For additional reports see Construction Daily.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

NEW JERSEY—BA 8/20—N. J. Turnpike Auth., 65 Prospect St., Trenton,
Middlesex Co.—constr. fuel pump island pavement at Service Areas 10S and 10W, Contr. R-BA; constr. an addnl. Toll Lane No. 6 at Interchange No. 10, Contr. R-8B. Joseph Morecraft, Jr., chn.

N. Y., Idlewild—PAVING, etc.—BA 8/20—Port of New York Auth., 111 Eighth Ave., New York, Zone 11, Contr. NYA-140.040, addnl. paving at fuel trucks parking facility; grading and placement of surcharge fill for Runway V Prime, Contr. NYA-920.002, New York International Airport. Plans deposit $30 each. CD 2/25/53.

Pa., Phila.—SUB-STATION—BA 8/23—Dpt. Procurement, City Hall Annex, Phila., Pa., Bid 4446, constr. Butler St. sub-station and rooms to house electrical equip. at Mount Vernon, Oxford and Cumberland Sts., and Allegheny and Hunting Park Aves. for Broad St. Subway Express System and appurtenant alterations and new construction. CD 3/25.

† **D. C., Wash.**—BOILER REPAIRS—BA 8/27—General Services Admin. P. Bldg. Serv., 19 and F Sts. N. W., Zone 25, boiler repairs for Maximum Security Bldg., St. Elizabeths Hospital, Proj. 49195.

N. Y., Buffalo—BA 8/29—Erie County Water Auth., 338 Ellicott Sq. Bldg., Zone 3, 36 in. diam. water transmission main in towns of Hamburg and Orchard Park. Buck, Seifert & Jost, 112 E. 19 St., New York, Zone 3, consult. engrs. Plans deposit $25. CD 12/20/55.

N. Y., Wallkill—BA 8/30—Town Bd. at office Harry C. Carpenter, engr., 4 Fairlawn Ave., Middletown, N. Y., sewers, laterals, etc. Washington Heights Sanitary Sewer District, Town of Wallkill. Plans deposit $25. CD 4/1/53.

BUILDINGS—BA

Pa., North Belle Vernon (P. O. Belle Vernon)—SCHOOL—BA 8/20—Pa. Pub. School Bldg. Auth., 101 S. 25 St. Harrisburg, high school addn., for North Belle Vernon School Bd., North Belle Vernon. Plans deposit $30. C. C. & E. E. Compton, 419 Thompson Ave., Donora, archts.

Del. New Castle—AUTO SALES, etc.—Bids Asked—Quillen Bros., Auth. Sales, Inc., auto sales and service bldg. $175,000. Pipe & Kruse, 911 Washington St., Wilmington, archts. CD 6/21, under LB.

HEAVY CONSTRUCTION—LB & CA

Castleton Contg. Co., Inc., 274 Myrtle Ave., St. George 10, N. Y., CA $72,702, b. con. on 8 in. concrete repaving roadway of Cary Ave. from Clove Rd. to Broadway, NEW YORK, President Richmond Boro Hall, St. George 15, S. I., New York. Bids June 27. CD 6/19.

Chain Link Fence Corp. and Chicago Fence & Equip. Co., 4307 W. 69 St., Chicago 29, Ill., CA $244,480. installing guard railing overhead structures between New York City and Buffalo on New York State Thruway, NEW YORK. New York State Thruway Auth., Delaware Plaza, Elsmere, N. Y. Bids June 19. CD 6/11.

† **Gibson & Cushman, Inc.**, 38 Homan Ave., Bay Shore, N. Y., CA $155,132. maintenance dredging Hudson River between Hudson and Stockport, CIVENG-30-075-57-88, NEW YORK. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Bids July 11. CD 6/21.

Cold Springs Constr. Co., 3 Jackson St., Akron, N. Y., CA $194,682, C.C. & I. Br. 246-1, Akron-Crittenden Rd., town of Newstead, BUFFALO, N. Y. Erie Co., Dpt. Hys., 134 W. Eagle St., Buffalo 2, N. Y.

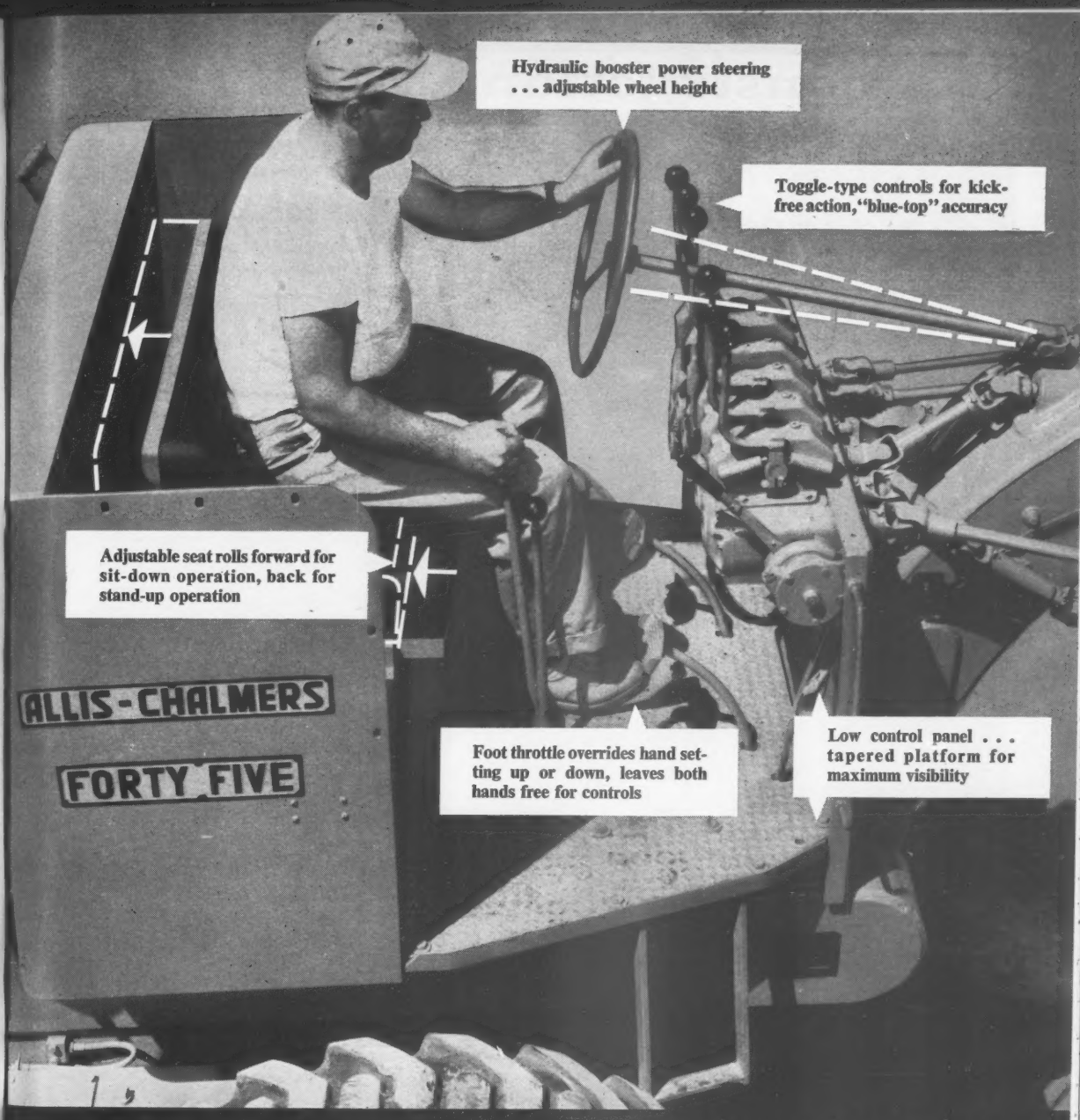
B & M Earthmoving & Constr. Corp., Bley Rd., Eden, N. Y., CA $155,047, Proj. 2-56, Tonawanda Creek Rd., Town of Amherst and Proj. 79-53-54, Lake View Rd., Town of Hamburg, BUFFALO, N. Y. Erie Co. Dpt. Hys., 134 W. Eagle St., Buffalo 2, N. Y. Bids June 21.

McDowell Sprinkler Corp., 150 Nassau St., New York, N. Y., LB $100,980. Contr. 2915; LB $99,270, Contr. 2945, sprinkler system and new street water supply service for Pier and Bulkhead Sheds No. 23 and 22, North River at foot of Harrison St. and foot of Jay St. respectively. NEW YORK, N. Y. Dpt. of Marine & Aviation, Pier 1, North River, New York 4, N. Y. Bids June 20. CD 6/7.

Jerome Di Menna Co. Inc., 2409 Arthur Ave., New York, N. Y. LB $129,247. Contr. 558, wid'n., recurbing W. 27 St., W. 30 St., E. 31 St., W. 37 St., E. 39; E. 43, W. 46, E. 54 Sts., NEW YORK, N. Y. President Manhattan Boro, Municipal Bldg., New York, N. Y. Bids June 18;
Edenwald Contg. Co., 151-45 6th Rd., Whitestone, N. Y., LB $104,294, Contr. 176, grading, regrading, curbing, recurbing, etc. in E. 37 St.; and Contr. 557, recurbing Bleecker St., St. Nicholas Ave., E., 10 E. 20, E 21, E. 62, W. 81, W. 164 and W. 184 Sts. (New York, N. Y.).

Chas. F. Vachris, Inc., 9024 Ditmar Ave., Brooklyn, N. Y., LB $949,872, Contr. 144C, Harlem River Dr. imprv., E. 125 St. to Harlem River Driveway, soil stabilization in roadway areas of Harlem River Dr.,

(Continued on page 120)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SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

(Continued from page 118)

E. 133 to W. 145 Sts. NEW YORK, N. Y. President Manhattan Boro, Municipal Bldg., New York 7, N. Y. Bids June 28. CD 6/19.

▲ **Sanitary Sewer Assocs.,** 347 Washington St., Orange, N. J., CA **$1,748,541,** total est. $8,640,000 (10 bidders), CRP-1, Pequannock water supply extension screen chambers and Echo Lake Pipe Line, NEWARK, N. J. City, City Hall, Newark, N. J. Bids July 22, awarded July 31. CD 7/25, under LB.

PENNSYLVANIA—Pennsylvania Turnpike Comn., Box 531, Harrisburg, Pa. Bids opened July 30,

Pa.—**New Enterprise Stone & Lime Co.,** New Enterprise, Pa., LB **$102,208,** surface treating 24 mi. shoulders and median strip and ramps, Contr. 127-B, Bedford and Fulton Counties; LB **$90,477,** surface treating 22 mi. shoulders 5 mi. median strips and ramps Contr. 127-A Somerset and Bedford Counties;

Pa.—**Russell Industries, Inc.,** 1 Prestley Rd., Bridgeville, Pa., LB **$146,732,** surface treating 32 mi. shoulders and 15 mi. median strip, also ramps, Contr. 127, Westmoreland Co. CD 7/8.

Kelly Paving & Constr. Co., 1347 E. High St., Phila., Pa., LB **$81,732,** Bids 3110 and 3111, paving; LB **$139,654,** Bid 3109, paving; LB **$196,993,** Bid 3108, paving; LB **$80,516,** Bids 3112, 3116 and 3120, paving; LB **$123,459,** Bid 3113, paving; PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. Bids July 25. CD 7/18.

Union Paving Co., Wynnewood, Pa., LB **$96,497.** Bid 3099, paving; LB **$83,760.** Bids 2098, 3100 and 3107, paving; LB **$159,984.** Bid 3125, paving (Phila., Pa.);

Asphalt Paving & Supply Co., Box 57, Norristown, Pa., LB **$83,486.** Bids 3102, 3103 and 3106 paving. (Phila., Pa.);

J. D. Morrissey, Inc., 9119 Frankford Ave., Phila., Pa., LB **$90,068.** Bid 3096, 3101 and 3123 paving. (Phila., Pa.).

Mack Paving & Constr. Co., E. Lycoming Ave., Phila., Pa., LB **$153,925.** Bid 3124, paving (Phila., Pa.).

Whiting Turner Contg. Co., National Marine Bank Bldg., Baltimore, Md., LB **$99,589,** bridge reconstr., University Ave. Bridge, over Schuykill River, PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. Bids July 25. CD 7/18, under Streets & Roads.

† **U. S. Eng.,** First and Douglas Sts., N.W. Wash. 25, D. C., cancelled bids to have been opened Aug. 1, modifications and addns., to Special AAA Sites, ENG-49-080-58-6-(5), MARYLAND AND VIRGINIA. CD 7/26.

BUILDINGS—LB & CA

Diocesan Bldg. Office, 191 Joralemon St., Brooklyn 2, N. Y., cancelled bids to have opened June 20, SCHOOL and CONVENT for St. Mary, Mother of Jesus Church, BROOKLYN, N. Y. Est. **$350,000,** will readvertise. CD 6/17.

John Oechslin, Inc., Commack Rd., Commack, N. Y., CA **$385,050.** SCHOOL and AUDITORIUM for St. Anthony of Padua Church, EAST NORTHPORT, N. Y. Diocesan Bldg. Office, 191 Joralemon St., Brooklyn 2, N. Y. Bids June 27. CD 6/17.

▲ **Deroe Builders, Inc.,** Route 46, Clifton, N. J., Own Forces, **$1,000,000,** 50 addnl. HOUSES as new section of Mountain Gardens, on Ridge Rd., CEDAR GROVE, N. J. Roche & Roche, 234 West 44 St., New York, N. Y., archts.

Murdock Contr. Co. Inc., 800 Clinton Ave., Newark, N. J., CA **$440,000,** general contract 50 unit low-income HOUSING on 6.4 acre tract between Somerset and Hamilton Sts., FRANKLIN TWP., (MIDDLEBUSH P. O.), N. J. Franklin Twp. Housing Auth., Town Hall, Middlebush, N. J. CD 10/26.

Carnegie Constr. Co., 57 So. Orange Ave., South Orange, N. J., CA **$823,000,** 70 addnl. HOUSING UNITS at Woodrow Wilson Homes and Garfield Court, LONG BRANCH, N. J. City of Long Branch Housing Auth., Garfield Court, Long Branch, N. J. Braun & Mancuso, 191 Broadway, Long Branch, N. J., archts.

Murray Weil, 543 Court St., Elizabeth, N. J. Owner Builds, **$800,000,** 24 HOUSES, Central Ave., MOUNTAINSIDE, N. J. Getter & Herzog, 1045 Kilsyth Rd., Kenilworth, N. J., archts.

H. D. Hoffman, 63 Parkside Ave., Plainfield, N. J., Owner Builds, **$900,000,** 30 HOUSES as Cedar Brook Park on Parkside Rd., Lakeview Terrace and Pemberton Ave., PLAINFIELD, N. J. Louis M. Steuben, 2092 Morris Ave., Union, N. J., archt.

▲ **B. J. Lucarelli & Co.,** 22 Orchard St., Jersey City, N. J., CA **$767,600,** general contract 21 rooms, JUNIOR HIGH SCHOOL, with cafeteria, gymnasium and library. Fairview and Mortimer Aves., RUTHERFORD, N. J. Bd. Educ., Borough of Rutherford, N. J. CD 11/5.

Consolidated Eng. Co., Inc., 20 E Franklin St., Baltimore, Md., CA **$250,000,** Batch PLANT and paving, SALEM, N. J. Anchor Hocking Glass Corp., 109 N. Broad St., Lancaster, Pa. The Rust Eng. Co., 575 6th Ave., Pittsburgh, Pa., engr.

Joseph R. Farrell, Inc., 4424 Market St., Phila., Pa., LB. Est. **$344,000,** BIOLOGY LABORATORY for Bryn Mawr College, BRYN MAWR, PA. Martin Stewart & Noble, 117 S. 17th St., Phila., Pa. Bids July 17. CD 7/18.

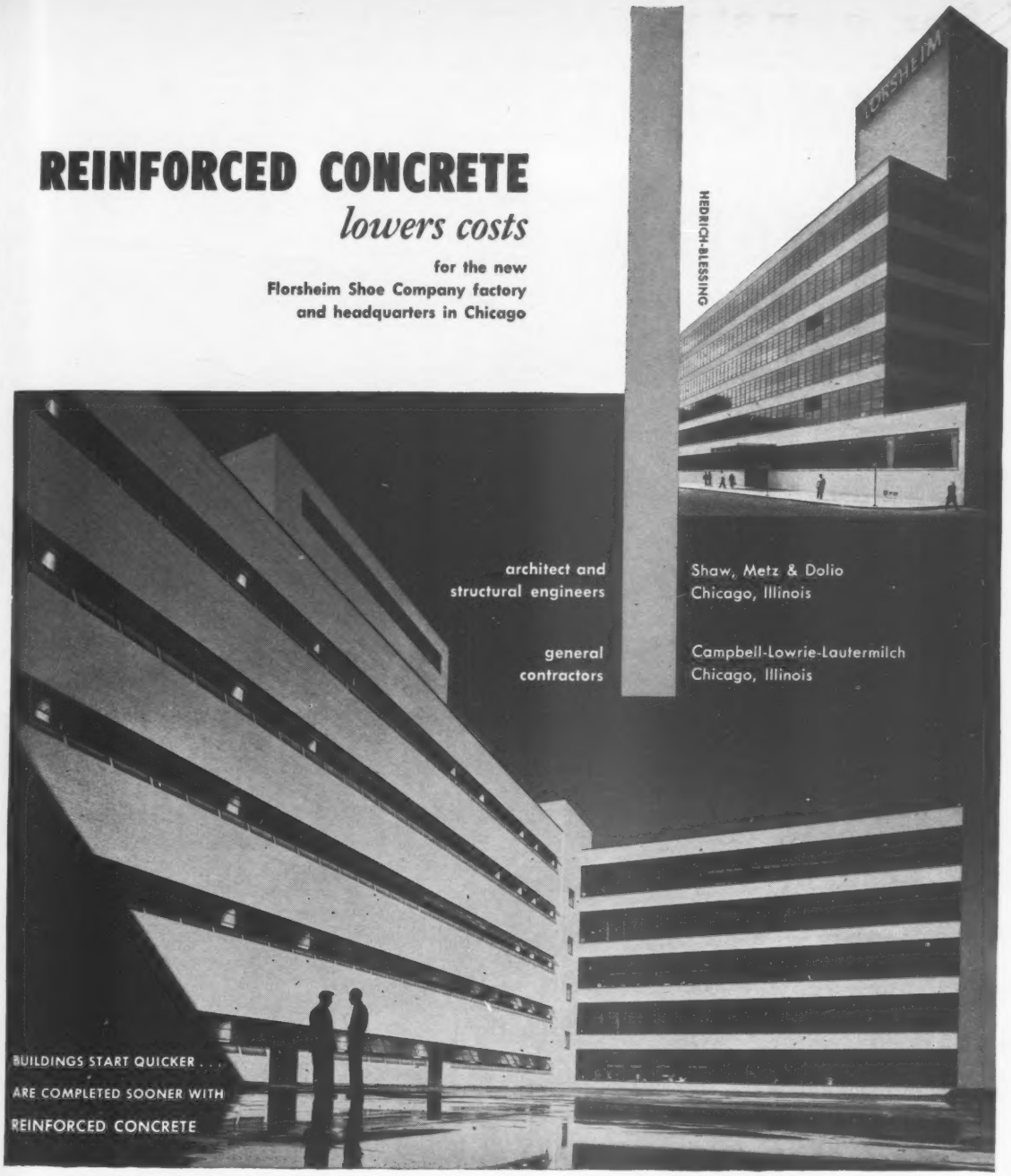
William H. Jefferys, Jr., & John D. Stevens, Chalfont, Pa., Separate Contracts. **$650,000.** 54-unit RESIDENTIAL DEVELOPMENT, Bogle Brae Farms CHALFONT, PA.

L-D Bldg. Co., Inc., Box 472, Latrobe, Pa., CA **$404,800** general contract, 2 elementary SCHOOLS for Derry Twp. School Dist., DERRY, PA. Pa. Pub. School Bldg.

(Continued on page 122)

REINFORCED CONCRETE
lowers costs

for the new
Florsheim Shoe Company factory
and headquarters in Chicago



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(Continued from page 120)

Auth., 101 S. 25 St., Harrisburg, Pa. Bids July 23. CD 8/1, under LB.

Fred E. Kemmer, 7319 Rising Sun Ave., Phila., Pa., Separate Contracts. $555,000. 37-unit RESIDENTIAL DEVELOPMENT, Lower Southampton Twp., FEASTERVILLE, PA.

▲ **Branna Constr. Co.,** 625 Farmers Bank Bldg., Pittsburgh 22, Pa., LB $1,271,000, general constr. Junior-Senior HIGH SCHOOL for Laura Lamar Joint School Bd., HOMER CITY, PA. Pub. School Bldg. Auth., 101 S. 25th St., Harrisburg, Pa. Bids July 30. CD 7/16.

Barclay White & Co., Market St., Phila., Pa., CA Approx. $500,000. OFFICE, City Line and President Ave., PHILA., PA. Stephen F. Whitman & Son, Inc., 415 Race St., Phila., Pa. Bids June 25. CD 6/13.

Glenn Development Corp., 1518 Walnut St., Phila., Pa., Separate Contracts. $350,000. RESIDENTIAL DEVELOPMENT, Glenn St., etc., PHILA., PA. Henry S. Berg, 1411 Walnut St., Phila., Pa., archt.

Master Masons Constr. Co., 1619 W. Thompson St., Phila., Pa., CA $500,000 . CHURCH, PHILA., PA. White Rock Baptist Church, 52 and Arch Sts., Phila., Pa. CD 3/19.

Robert E. Lamb & Son, Inc., 3429 W. Indiana Ave., Phila., Pa., CA $800,000. BOILER HOUSE exten., POTTSTOWN, PA. Firestone Tire & Rubber Co., Pottstown, Pa. Bids July 22. CD 7/19.

Joseph Ciavagelia, 4156 Orchard St., Phila., Pa., Separate Contracts. $344,000. RESIDENTIAL DEVELOPMENT, Bristol Rd. etc., RICHBORO, PA.

Turner Constr. Co., 1500 Walnut St., Phila., Pa., CA Est. over. $344,000. WOMEN'S DORMITORY, SWARTHMORE, PA. Swarthmore College, Swarthmore, Pa. CD 3/9/55.

L. Polic, 2599 Baird Blvd., Camden, N. J., CA $350,000. RESIDENTIAL DEVELOPMENT, Carroll Dr., TREVOSE, PA. Woodvale Homes, Inc., 6239 Frankford Ave., Phila., Pa. L. Levin, 311 S. 20 St., Phila., Pa., archt.

Maryland Electronic Mfg. Corp., 5009 Calvert Rd., College Park, Md. Owner Builds, $200,000, PLANT addn., Calvert Rd., COLLEGE PARK, MD.

F. & L. Constr. Co., 902 H St. N.E., Wash., D. C., CA Est. $350,000, two 3 story, brick, cinder brick, 50 unit APARTMENTS, 1816-20 Irving St. N.E., WASH., D. C. Formant Realty Co., 902 H St. N.E., Wash., D. C. Earl Von Reichenback, 1219 Good Hope Rd. S.E., Wash., D. C., archt.

Calomiris Constr. Corp., 1012 7 St., N.W., Wash., D. C., CA Est. $750,000, 8 story, brick, concrete, cinder block, 65 unit APARTMENT, 3201 Wisconsin Ave., N.W., WASH., D. C., Southwest Properties, Inc., 1012 7 St. N.W., Wash., D. C. Thomen & Cromar, 8226 Fenton St., Silver Spring, Md., archts.

SOUTH

HEAVY CONSTRUCTION—BA

† **Va., Portsmouth** — KEEL AND BILGE BLOCKS — BA 8/20—Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, keel and bilge blocks, Norfolk Naval Shipyard, NBy 11026, Spec. No. 11026/57.

† **Fla., Cocoa**—UTILITIES, etc.—BA 8/21—U. S. Eng., P. O. Box 4970, Jacksonville, facilities, off site sewer mains, sewage tr. and utilities, disposal plant, water mains, electricity, Patrick Air Force Base, Norman G. Giller & Assocs., 975 Arthur Godfrey Rd., Miami Beach, archts. CD 8/23/56.

† **Louisiana**—BA 8/28—U. S. Eng., foot of Prytania St., New Orleans, Inv. No. 58-13, levee embankment, Inv. 58-13.

† **Va., Gravelly Point**—AIRPORT—BA 8/28—General Service Admin., Pub. Bldgs. Service, Room 3340 General Services Bldg., 19th and F Sts., N.W., Wash., D. C., combined finger and baggage room Washington National Airport, Appr. No. 412-X-X-81000, Proj. No. 44121-3. CD 5/4/56.

BUILDINGS—BA

La., Eunice—SCHOOL, etc.—BA 8/29—Acadia Baptist Academy, Eunice, high school classrooms, chapel and library, etc., on academy grounds, Frey-Huddleston & Assocs., 1010 Creswell Ave., Shreveport, archts.

BUILDINGS—SLC

Fla., Hallandale—PLANT—Florida Tallow Corp., c/o S. H. Zachar, archt., 1630 Lenox Ave., Miami Beach, soon lets contract 1 story, 88x103 ft. CB-S. Processing plant, SR No. 9, Beach Rd., A. Harvey Baxter, 501 Coral Way, Coral Gables, structural engr. Sasnett Engr., Inc., 561 NE 79 St., Miami, mechanical engr.

Fla., Port of Palm Beach—WAREHOUSE—Port of Palm Beach Dist., Port Rd., Riviera Beach, soon lets contract. 120x360 ft. warehouse, Slip No. 2, Port of Palm Beach, Gee & Jensen, 117½ S. Dixie St., West Palm Beach, consult. engrs.

Fla., West Palm Beach—PLANT IMPRVS.—Pratt & Whitney Aircraft Operations, Box 2691, soon lets contract, Job. No. 2129A, Proj. No. 5751, sewage tr. industrial waste treatment and water purification sys. George H. Miehls, 345 New Center Bldg., Detroit 2, Mich., engr. CD 9/10.

Fla., Winter Haven—CHURCH—First Baptist Church, W. Central Ave. and S.W. 2 St., soon lets contract, 4 story, part bsmnt., 70x230 ft. steel frame, brick facing church addn., W. Central Ave. and 2 St. Reginald C. Knight, 214 Giralda Ave., Coral Gables, archt.

HEAVY CONSTRUCTION—LB & CA

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh, Bids opened 7/30.

N. C.—Asheville Contr. Co., Box 5119, Asheville, N. C., LB $299,718, est. $300,000-$400,000, structures on relocation US 70 and 25 from point near Walnut, southeast 4.5 mi. Work Order No. 8.19723, Madison Co.;

N. C.—Crowder Constr. Co., Inc., Box 71, Charlotte, N. C., LB $168,474, est. $150,000-$175,000, structures on relocation of N.C. 27 from Pee Dee River to point approx. 3 mi. west of Troy, Work Order No. 8.15580 F-80(10), Montgomery Co.;

N. C.—Sanford Constr. Co., Box 427, Sanford, N. C., LB $260,665, est. $250,000-$300,000, wid'n. existing bridges over New River and Chaney Creek on US 17 at Jacksonville, Work Order No. 8.13651 F-269(4), Onslow Co.;

N. C.—Jesse M. Coble, Box 664, Greensboro, N. C., LB $349,743, est. $300,000-$400,000, structures on relocation US 1 and 158 between Henderson and Middleburg. Work Order No. 8.14725 I-668(7), Vance Co.;

N. C.—Kitchin Constr. Co., Box 3277, Fayetteville, N. C., LB $208,396, est. $175,000-$200,000, wid'n. structures N. C. 27 between Albemarle and US 601, Work Order No. 8.16862, Stanly and Cabarrus Counties. CD 7/22.

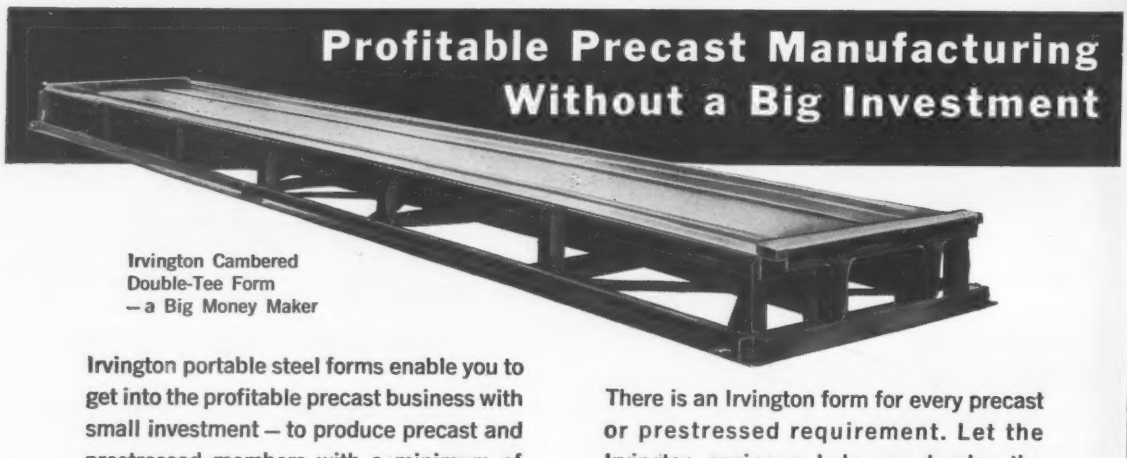
▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh, Bids open 7/30,

N. C.—Macon Constr. Co., Franklin, N. C., LB $893,025, est. $400,000-$500,000, CABC, base surf. treat. relocation US 70 and 25 from point near Walnut, southeast 4.5 mi., Work Order No. 8.19723, Madison Co.; LB $424,550, est. $400,000-$500,000, CABC, base surf. treat. 4.63 mi. N.C. 281 from point 2.6 mi. east of Tuckaseigee, east 0.445 mi. and N.C. 281 from point 4.21 mi. east of Tuckaseigee, east to point near Canada School. Work Order No. 8.19574 S-621(2), S621(3), Jackson Co.;

N. C.—Jesse M. Coble, Box 664, Greensboro, N. C., LB $829,249, est. $400,000-$500,000, sub-grade reinf., conc. pavt. wid'n. 9.22 mi. existing US 64 and 70 from point 2 mi. northeast of Hildebran, northeast to point approx. 1 mi. southwest of Conover. Work Order No. 8.16249, Catawba Co.;

N. C.—Dickerson, Inc., Monroe, N. C., LB $124,070, est. $100,000-$125,000, CABC, base surf. treat. and structures 2.06 mi. county road from east city limit of Roxboro, east to point on Brooksdale-Allensville Road approx. 3 mi. west of Allensville, Work Order No. 8.25408, S-468(2), Parson Co.;

(Continued on page 125)



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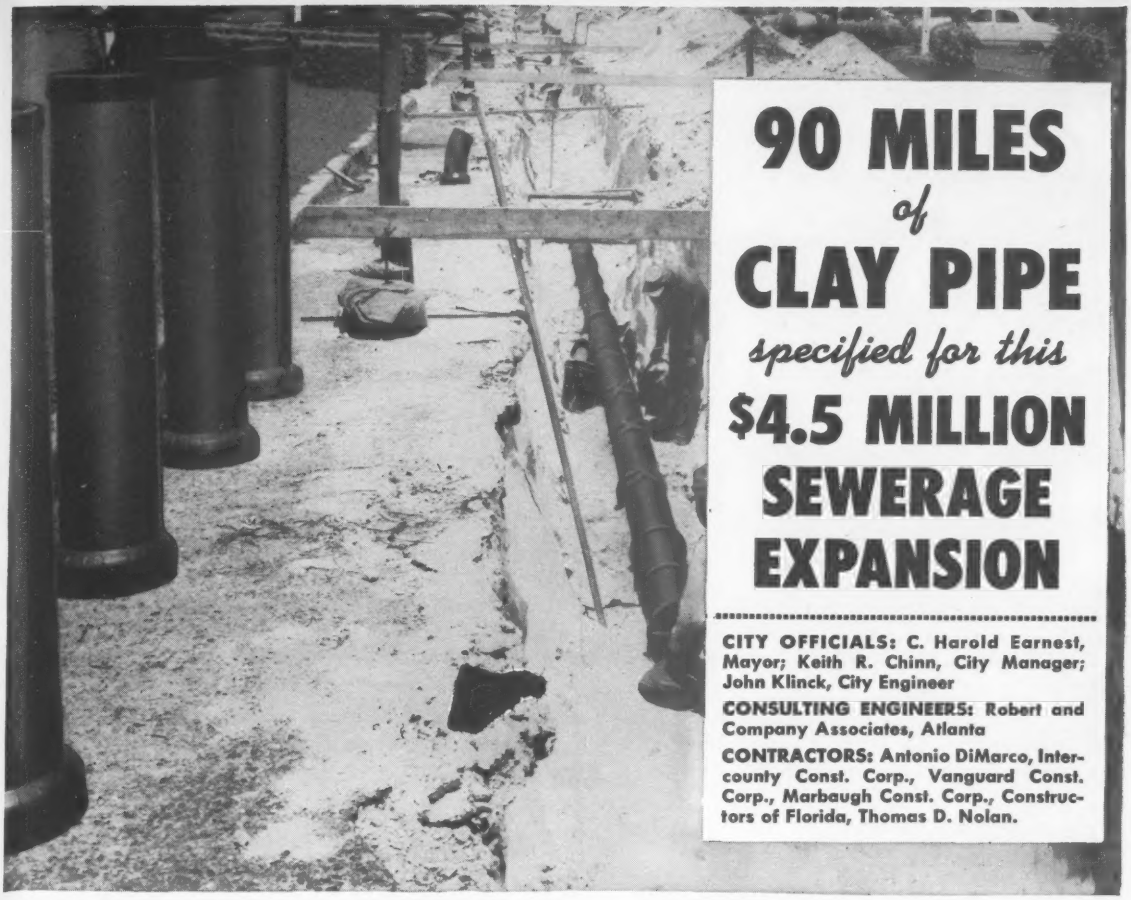

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CITY OFFICIALS: C. Harold Earnest, Mayor; Keith R. Chinn, City Manager; John Klinck, City Engineer

CONSULTING ENGINEERS: Robert and Company Associates, Atlanta

CONTRACTORS: Antonio DiMarco, Intercounty Const. Corp., Vanguard Const. Corp., Marbaugh Const. Corp., Constructors of Florida, Thomas D. Nolan.

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Unstable earth materials—in fact, all water-bound solids—call for selection of hydraulic dredges for road construction. Contractors almost universally prefer Ellicott dredges to obtain lowest cost per cubic yard of stable fill.

Particularly applicable to road-building in low-lying, boggy inland areas, Ellicott "DRAGON" Model Hydraulic Dredges are specially constructed to be taken apart and reassembled easily, allowing them to be transported overland from job to job by truck or lowboy, the primary problem of work in land-locked sections. Very little water is needed for flotation, while the discharge pipes of the Ellicott "DRAGON" can be set up to transport excavated material over distances of more than half a mile. The result of all these qualities?...a highly efficient and economical dredge whose versatility and portability make it a unique example of engineering skill "custom-tailored" to the job at hand.

"DRAGON" Model Hydraulic Dredges, built in size ranges from 8 to 20 inches for every dredging requirement, are the most economical means available for moving water-bound solids. Designed and manufactured by the Ellicott Machine Corporation, the oldest and largest exclusive builder of dredges and dredging equipment in the world. For more information, write for full, descriptive literature.

4326

Ellicott Dredges

1603 BUSH STREET, BALTIMORE 30, MD., U. S. A.

(Continued from page 122)

N. C.—**Ray D. Lowder, Inc.,** Albemarle, N. C., LB **$431,896,** est. $400,000-$500,000, grading 8.41 mi. relocation of N.C. 27 from Pee Dee River to point approx. 3 mi. west of Troy, Work Order No. 8.15580 F-80(10), Montgomery Co.;

N. C.—**Dick's Electrical Co.,** Wilson, N. C., LB **$82,860,** est. $125,000-$150,000, lighting system on portion US 158 East-West Expressway at Winston-Salem, Work Order No. 8.17479 IN-35(9), Forsyth Co.;

N. C.—**Wright Contr. Co.,** Columbus, Ga., LB **$606,469,** est. $400,000-$500,000, sub-grade reinf. c. conc., 1.45 mi. US 158 from west city limits of Winston-Salem to Cloverdale Ave. (port of Expressway), Work Order No. 8.17481 1-35(10), Forsyth Co.;

N. C.—**Asheville Paving Co.,** Box 7068, Asheville, N. C., LB **$118,496,** est. $125,000-$150,000, b. conc. 9.95 mi. US 19 and 23 from N.C. 112 west of Enka to Canton city limits and 2 streets in Canton. Order No. 6.841167, 6.941145 Code 9.81404, Buncombe and Haywood Counties;

N. C.—**F. D. Cline Paving Co.,** Box 349, Raleigh, N. C., LB **$279,637,** est. $250,000-$300,000, STBC, base surf. treat., b. conc. binder and surf. 3.49 mi. US 301 from point approx. 2 mi. north of Fayetteville to Eastover, Work Order No. 8.13435 I-703(7), Cumberland Co. CD 7/22.

FLORIDA—State Road Dpt., Tallahassee,

J. D. Manly Constr. Co., Box 586, Leesburg, Fla., CA **$524,299.** limerock base, surf. tr., etc. from Cassia northeasterly approx. 8.56 mi. to point near Crows Bluff, S.P. Job 1111-107, SR 44, Lake Co. Bids June 27. CD 7/3, under LB.

▲† **Belcher Oil Co.,** 1217 Biscayne Blvd., Miami, Fla., LB **$1,243,749,** est. $1,134,477 (3 bidders) constr. pump station, Central and Southern Fall Flood Control Proj., ENG 03-123-57-87, FLORIDA. U. S. Eng., Box 4970, Jacksonville, Fla. Bids July 26. CD 7/15.

LOUISIANA—State Dpt. Hys., R. B. Richardson, dir. Hy. Office Bldg., Baton Rouge,

T. L. James & Co., Inc., Box 531, Ruston, La., CA **$918,459,** wid'n. existing c. conc. pavt. with bit. hot mix and other work in connection there Leesville, Hornbeck Hy. Rte. LA-US 171, S. P. 25-01-13. Sections 1 and 2, Vernon Parish, CD 6/20, under LB.

BUILDINGS—LB & CA

▲† **Florida Builders, Inc.,** 700 43 St. S., St. Petersburg, Fla., LB **$15,083,464** Base Bid, 999-units armed services HOUSING Project, Patrick Air Force Base, ENG-08-606-58-1, COCOA, FLA. Contracting Officer, Air Force Missile Test Center, Cocoa, Fla. Bids July 31. CD 7/15, under Airports.

Broadview, Inc., 1955 S. W. 50 Ave., Ft Lauderdale, Fla., Owner Builds. **$500,000,** 52 RESIDENCES, Broadview Country Club Estates, FT. LAUDERDALE, FLA.

Richardson Constr. Co., 645 N. W. 7 Ave., Ft. Lauderdale, Fla., LB **$355,138,** Blanche Ely HIGH SCHOOL, 801 N. W. 10 St., POMPANO BEACH, FLA. County Bd. P. Instruction, 1320 S. W. 4 St., Pompano Beach, Fla. CD 7/19.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ohio—TELEPHONE PROJECT—BA 8/21—Ottoville Mutual Telephone Co., Ottoville, Proj. Ohio 513A, Ottoville, incl. 81.49 mi. telephone lines, in Putnam Co. Plans deposit $10. Philip L. Burns, 630 Davenport Bank Bldg., Davenport, Iowa, consult. engrs.

O., Cleveland—BA 8/22—Comrs. Cuyahoga Co., County Administration Bldg., Zone 13, wid'n. Warrensville Center Rd. from Fairmount to Kinsman Rds. $487,900. Plans deposit $10. Albert S. Porter, Standard Bldg., Zone 13, co. engr. CD 9/1/54.

BUILDINGS—BA

Ind., Indianapolis—SCHOOL—BA 8/20—Bd. School Comrs. City of Indianapolis, Grade School No. 2 to be located new site at S. E. corner E. St. Clair and New Jersey Sts. $650,000. Plans deposit $30, Bevington Taggart & Fowler, K of P Bldg., engrs. Edward D. James & Assocs., Inc., 130 E. Washington St., archts.

Mich., Pontiac—STORAGE GARAGE, etc.—BA 8/20—Oakland Co. Bd. Rd. Comrs., 2420 Pontiac Lake Rd., 30,400 sq. ft. storage garage and 9,000 sq. ft. warehouse bldg.

▲ **O., Columbus**—PHYSICS—BA 8/27—Ohio Dpt. P. Wks., State Depts. Bldg., physics bldg. addn., Ohio State University, $1,400,000. Plans deposit $35. Richard L. Tully & Frederick H. Hobbs Jr., 582 Oak St., archts. CD 6/18.

▲ **O., Athens**—LIFE SCIENCE—BA 8/30—Ohio Dpt. P. Wks., State Dpt. Bldg., Columbus, Life Science Bldg., Ohio University, $1,450,000. Plans deposit $35. Geo. S. Voinevich, 1922 E. 107 St., Cleveland, Zone 6, archt.

Ind., Evansville—MUSEUM—BA 9/1—City Park Bd., 40,000 sq. ft., split-level museum bldg., Sunset Park, $600,000. CD 4/28/53.

HEAVY CONSTRUCTION—LB & CA

Byrnes-Conway Co., 50 Oak St., St. Bernard, O., CA **$124,215,** 6 to 24-in. c.i. water lines, Sharon Rd., CINCINNATI, O. Hamilton Co., Courthouse, Cincinnati, O. Bids July 23, awarded July 30.

Wm. L. Schloss Asphalt Paving Co., 9521 Woodland Ave., Cleveland 4, O. LB **$94,537,** est. $102,200 (2 bidders) resurf. Lee Rd. from Miles to McCracken Rd. and Harvard Ave. from E. 131 to E. 154 Sts., CLEVELAND, O. Comrs. Cuyahoga Co., Courthouse, Cleveland 13, O. Bids July 22. CD 7/17.

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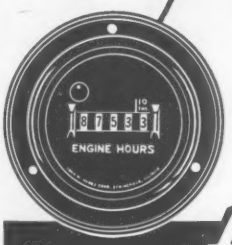

Beat down-time through timely maintenance . . . know WHEN lubrication, oil change, overhaul, etc., are due. Today's engineers recommend maintenance in terms of operating time instead of distance . . . the Hobbs Engine Hour Meter provides that information. Not a revolution counter, but a true electric timing instrument recording HOURS and MINUTES. Ruggedly built . . . simple to install . . . easy to read. For both gasoline and diesel engines. Approved and recommended by leading manufacturers. **See your factory branch, representative, distributor . . . or WRITE:**

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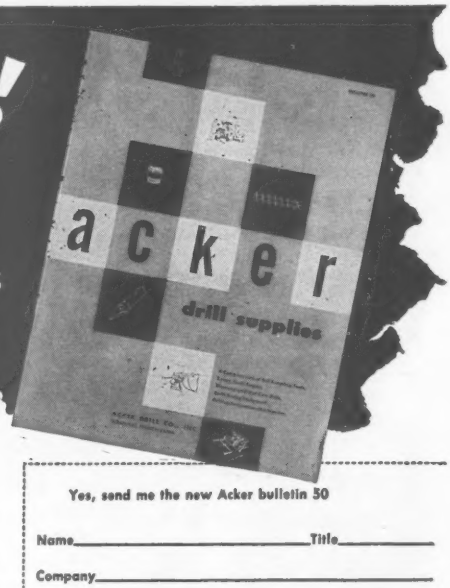

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MORLIFE® Over-Center CLUTCHES Provide

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Small Spring Loaded

Heavy Duty Spring Loaded

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Heavy Duty Over Center

Power Take-Offs

Speed Reducers

ROCKFORD Spring-Loaded CLUTCHES, equipped with MORLIFE clutch plates, provide 100% more torque grip than previous type clutches of equal size. This permits the use of smaller diameter clutches. Easier operation is accomplished by reducing the required engaging pressure. 50% better heat disposal avoids down-time caused by burned or warped plates. Numerous field records prove that MORLIFE clutches operate 400% longer without plate replacement or adjustment. Let these NEW type clutches help improve the operation of *your* heavy-duty machines.

BW **SEND FOR THIS HANDY BULLETIN** Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER

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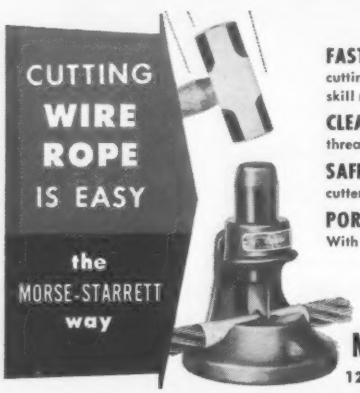
CLUTCHES

CUTTING WIRE ROPE IS EASY the MORSE-STARRETT way



FAST Especially designed cutting blade and dies assures fast cutting action. The hammer principle eliminates any special skill requirements.

CLEAN Wire rope ends are cut smooth and clean for perfect threading or splicing.

SAFE The enclosed cutting blade locked in the body of the cutter assures perfect safety.

PORTABLE Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1-1/16 inch, 1-1/2 inch.

SEE YOUR DEALER OR WRITE DEPT. "B"

MORSE-STARRETT PRODUCTS CO.

1204 - 49th AVENUE, OAKLAND 1, CALIFORNIA

Don J. Roe, Vandalia, O. CA **$40,157,** Contr. A, permanent supply wells, VANDALIA, O. Village, Rodney Oakes, clk, Village Hall, Vandalia, O. Grand total $332,402. Bids June 24, CD 6/12;

Oberer Constr. Co., 4324 Webster St., Dayton 4, O. CA **$187,805,** Contr. B, water mains (Vandalia O.);

Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh, Pa., CA **$104,440.** Contr. C, 500,000 gal. elevated tank (Vandalia, O.)

Ideco Co., 875 Michigan St., Columbus, O., CA Total est. **$150,000.** television tower, YOUNGSTOWN, O. Alfayjean Realty Co., c/o Al. Wagner, 3121 Market St., Youngstown, O. WKST Broadcasting Co., New Castle, Pa. lessee;

Owner Builds, transmitter and studio building 3800 Shady Run Rd., (Youngstown, O.)

Layne Northern Co., Mishawaka, Ind., CA **$97,113,** WW imprvs., Contr. A, well bases, yard piping, lift station, iron removal plant, revisions in pumping station, etc., MONTICELLO, IND. City, Wilmer A. McClintic, mayor, City Hall, Monticello, Ind. Bids June 25. Grand total $306,203. CD 5/31.

Russell Hornback, Monticello, Ind. CA **$110,974,** Contr. B, incl. 22,500 lin. ft. 10 in. c. I. pipe, valves, fire hydrants, etc. (Monticello, Ind.);

Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moints, Iowa, CA **$98,120,** Contr. C, installing 500,000 gal. elevator tank and foundations. (Monticello, Ind.).

ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., State Fair Grounds, Springfield,

Central Eng. Co., 2531 Rockingham Rd., Davenport, Iowa, CA **$452,326,** steel through girder railroad subway structure carrying C. and N. W. R. R. over F. A. Rte. 7 and two steel I-beam structures for run-around tracks, north side and south side, widening rein.-con. box culvert for Cat Tail Slough and 0.39 mi. c. conc. pavement, all on U. S. Rte. 30 fom 2.4 mi. to 3.1 mi. east of Fulton, Whiteside Co. CD 7/10.

▲ **ILLINOIS**—State Div. Hys., Centennial Bldg., Springfield, Bids opened 8/2

Ill.—**Bethlehem Steel Co.,** Bethlehem, Pa., LB **$194,758** (5 bidders) steel for grade separation F. A. Rte. 14 with US Rte. 460 approx. 1.5 mi. west of Belleville, Sect. 28-2HB Proj. U-110(25), Dist. 8, St. Clair Co.;

Ill.—**McCann & Co. Inc.,** 2145 Devereaux, Springfield, Ill., LB **$266,937,** (2 bidders), bridge, approaches over Sangamon River east of Springfield, F. A. S. Rte. 630, Sect. 87B, Proj. S-648(1), Dist. 6, Sangamon Co.;

Ill.—**Illinois Steel Bridge Co.,** Jacksonville, Ill., LB **$356,089** (4 bidders), steel for 8-span WF-beam bridge in East Peoria, Proj. U-UG-131 (13), Dist. 4, Tazewell Co.;

Ill.—**Fitzsimmons & Connell, Dredge & Dock Div.,** Peoria, Ill., LB **$458,000** (3 bidders), 2 bridges F.A.I. Rte. 5 in Peoria and ramp for F.A.I. 5 over SB 8 in E. Peoria, Proj. I-05-4 (7), Dist. 4, Tazewell Co.;

Ill.—**Vierling Steel Works,** 53 W. Jackson, Chicago, Ill. LB **$90,567** (6 bidders), steel for grade separation structure and bridge over Dupage River west of Joliet, Sect. 99-2HF and 69F, Proj. I-03-6 (19) and S-769 (1), Dist. 1, Will Co.;

Ill.—**Manntz & Oren Inc.,** Effingham, Ill., LB **$449,287** (2 bidders), 2 bridges and widening S.B. 1 Rte. 15 north of Wayne City, Wayne Co.;

Ill.—**Chicago Heights Trading Co.,** 1632 Wentworth, Chicago, Ill., LB **$102,239** (7 bidders), furnish steel for 4-span grade separations on F.A.I.-7 northeast Collinsville, Sect. 60-0 HF Proj. 1-07-2 (2), Dist. 8, Madison Co.;

Ill.—**West Constr. Co.,** 1208 So. Bunn, Bloomington, Ill., LB **$93,769** (3 bidders), two 3-span rein.-con. bridges on US 51 southwest of Hudson, Sect. 62-B-1, Proj. F-77 (4), Dist. 3, McLean Co.;

Ill.—**States Improvement Co. Inc.,** 300 W. Washington, Chicago, Ill., LB **$410,397** (4 bidders), new lighting sys. installation and reconstr. deck on one 3-span bridge SA Rte. 180A in Blue Island, Sect. 180A-0101-1-15d-I, Dist. 10, Cook Co.;

Ill.—**Carl E. Soderquist & Sons,** 300 No. 2nd St., Charles, Ill., LB **$88,763** (4 bidders), WF beam bridge over Waubansee Creek F.A. Rte. 192 approx. 1 mi. south of Aurora, F.A. Rte. 192, Sect. 11B-1 Proj. F-280 (4), Dist. 1, Kendall Co.;

Ill.—**G. H. Allen,** Vincennes, Ind., LB **$612,483** (2 bidders), 2 precast bridges and others on F.A.I. Rte. 8, Sect. 51-24 B-1, ACB-1, Proj. I-08-4 (8), Dist. 7, Lawrence Co.;

Ill.—**R. R. Anderson Co.,** 4550 W. Patterson, Chicago, Ill., LB **$1,193,401** (2 bidders), 3-span grade separation F.A.I. Rte. 1 over B.N.O. RR, C.T.A. tracks and Congress Street Expressway, Sect. 3233-211VA Proj. I-01-4 (42), Dist. 10, Cook Co.;

Ill.—**General Paving Co., Inc.,** 30 E. John, Champaign, Ill., LB **$199,350,** two parallel, 3-span precast pretensioned concrete I-beam bridges over Salt Fork River F.A.I. Rte. 5 northwest of St. Joseph, Sect. 10-7B-1, Proj. I-05-5 (6), Dist. 5, Champaign Co.;

Ill.—**Dale Denny Constr. Co.,** Anna, Ill., LB **$82,720** (4 bidders), 3 span I-beam bridge S.B.I-146 West of Jonesboro, Union Co.;

Ill.—**A. J. Walker Constr. Co.,** 421 S. 21st., Mattoon, Ill., LB **$95,156** (4 bidders), widen and extend two bridges on US 36, between Hume and Chrisman, Sect. (14B, 149) BY, Proj. F-135 (19), Dist. 5, Edgar Co.;

Ill.—**Hasse Constr. Co.,** Calumet City, Ill., LB **$119,746** (2 bidders), b. conc. wearing surf. for two 7-span bridges F.A. Rte. 122 over Little Calumet, Sect. 42B-11-1, Dist. 10, Cook Co. CD 7/23.

▲ **ILLINOIS**—State Div. Hys., Centennial Bldg., Bids opened 8/2,

S. G. Groves & Sons Co., 1104 W. Reynolds, Springfield, Ill., LB **$2,970,041** (3 bidders), c. conc. paving 7.8

(Continued on page 130)

WORLD'S FIRST ALL-COMMANDER AIRLINE

NEW AIRLINE SERVICE INAUGURATED FOR ARGENTINA

An airline operating over the rugged terrain of Argentina demands truly superior performance from its airplanes. After a careful study of available executive aircraft, Aerotransportes Literal Argentina, with Commander Gabriel A. Bo' as managing director, selected Aero COMMANDERS.

Commander Bo' (Argentina Air Force Ret.) said that ALA will use the 7-place Aero COMMANDERS exclusively in their operation — taking advantage of the luxurious passenger comfort, high speed and unprecedented single-engine performance at all altitudes. The ALA COMMANDER air fleet will be home-based at Rosario.

The Construction Industry around the world takes advantage of Aero COMMANDER's higher speed, greater payload, and outstanding short-field performance.

The shiny new fleet of 7-place Aero Commanders makes eight to ten flights daily from the home base at Rosario—transporting passengers and cargo to and from Buenos Aires, Mendoza, Montevideo, Cordoba, Mar Del Plata, Tucuman, Bahia Blanca and Resistencia.

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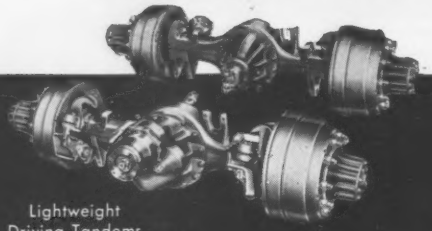
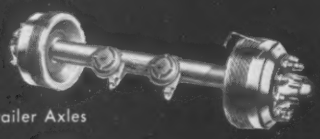
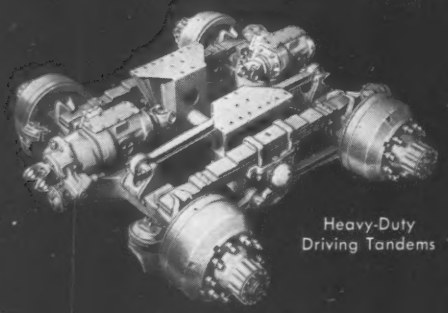


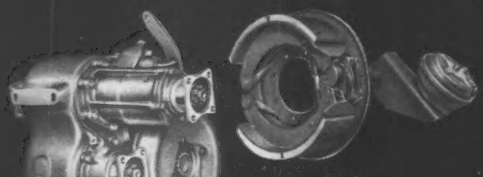
Lightweight
Driving Tandems



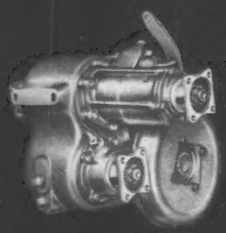
Trailer Axles



Heavy-Duty
Driving Tandems



Brakes



Gear Boxes

Single Driving Axles

Front Axles

Whether your requirements call for highway or off-the-road equipment—Timken-Detroit offers torture-tested axles and brakes proven by almost 50 years of field testing and laboratory research!

Timken-Detroit meets all your requirements for driving, trailer and front axles . . . brakes and gear boxes . . . with a complete range of capacities in each product category. Shown here are some of the units included in the complete line.

Nearly 50 years of manufacturing experience—plus continuing field and laboratory research—have taught Timken-Detroit the exacting needs of the trucking industry. Timken-Detroit Axles and Brakes are designed and built to give you the utmost in service, safety and dependability.

To you—this leadership in power transmission and braking systems means more productive road time, reduced operating costs and lower maintenance expense. Timken-Detroit Axles and Brakes are engineered to carry more payload . . . and stop more payload . . . at lower operating costs under all conditions.

The Timken-Detroit line of Medium and Heavy Duty Double-Reduction Tandems is an example of the superior engineering features and quality built into every Timken-Detroit product.

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York
Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

TIMKEN Detroit AXLES
TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
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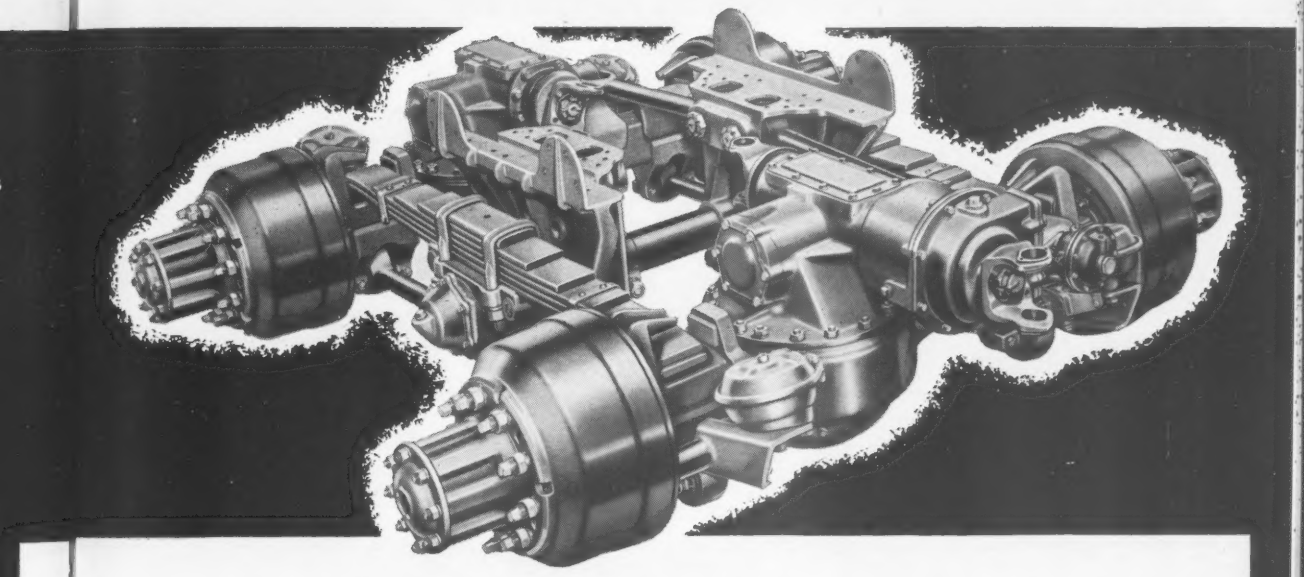
Axles and Brakes for Commercial Vehicles

Products of Rockwell Spring and Axle Co.



Timken-Detroit Heavy-Duty Double-Reduction Tandems Give You Payload Leadership!

Ability to take the toughest going and still deliver the load on time has helped make these rugged tandems the number one choice with operators of heavy-duty vehicles. These tandems give you the big advantages of long trouble-free service, economical performance and utmost dependability.

Here are a few of the features developed in famous Timken-Detroit Tandem Drive Units—

"Cradle Ride" Suspension...free ends of long, resilient springs float in axle spring guide brackets. This permits axles to articulate freely, adjusting themselves to road irregularities. Floating springs cradle the vehicle, materially reducing road shock and eliminating source of vehicle flutter. "Cradle Ride" suspension stabilizes the load, permits easy, restful driving . . . improves driver control and safety. Driving and braking forces are transmitted only through torque rods.

Hypoid Gears with their larger pinions and greater tooth contact give you outstanding performance, top efficiency and long life—plus lower maintenance costs.

Inter-Axle Differential divides torque evenly between axles . . . yet permits wheels of one axle to turn faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work. Driving parts and tires last longer. Controlled from the cab, differential can be locked out at any speed to give positive through drive.

Rectangular Shaped Axle Housings are forged from high carbon steel. This rectangular shape, combined with full strength corner sections, provides the greatest strength possible with minimum weight and size.

Famous Torsion Flow Axle Shafts are made even stronger through the use of more splines and greater root and body diameter.

Dependable Heavy Duty "P" Series Air Brakes with unit-mounted design make a compact self-contained assembly. Temperatures are lower and liner life is longer because of open type spiders. Tapered "Econo-liners" provide greatest thickness in area of greatest wear.

Unequaled parts interchangeability gives you more time on the road—reduces parts inventory—speeds service. Parts are standard items readily available.

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WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSSES AND TRAILERS

(Continued from page 126)

mi. AASHO Test Rd., LaSalle to Ottawa, Proj. I-06-3 (2) Sects. 2 and 2-1, LaSalle Co.; LB $2,926,772 (2 bidders), b. conc. paving 7.8 mi. same road; LB $5,690,000 (1 bidder), combination of 2 projects. CD 7/23.

▲ **ILLINOIS**—State Div. Hys., Centennial Bldg., Springfield, Bids opened 8/2,

Ill.—**Triangle Constr. Co.**, 480 No. Evergreen, Kankakee, Ill., LB $85,060 (1 bidder), bit. surf. treat. 3.63 mi. from 1¼ mi. east of Conovan northerly and easterly, F. A. S. Rte. 1330, Sect. 203Q, Proj. S-883(1), Dist. 3, Iroquois Co.; LB $99,311 (3 bidders), bit. surf. treat. 4.05 mi. from 3 mi. east of Chebanse easterly and northerly, Sect. 115Q, F. A. S. Rte. 1322, Proj. S-759(3), Kankakee Co.;

Ill.—**General Paving Co.**, 30 E. John, Champaign, Ill., LB $124,232 (2 bidders), b. conc. resurf. and variable c. conc. base course 1.73 mi. from Longview, northerly F. A. S. Rte. 522, Proj. S-229(2), Dist. 5, Champaign Co.; LB $228,168 (3 bidders), b. conc. resurf. 2.83 mi. from Ivesdale, easterly and northerly, F. A. S. Rtes. 529 and 532, Projs. S-729 (2) & S-856 (1), Dist. 5, Champaign Co.;

Ill.—**Wood Electrical, Inc.**, 2326 W. Ogden, Chicago, Ill., LB $116,136 (3 bidders), install 7 traffic control signals in Chicago, Cook Co.; LB $113,001 (3 bidders), install traffic control signals at 7 intersections, Chicago, Cook Co.;

Ill.—**Green Constr. Co.**, Oaktown, Ind., LB $697,664, (3 bidders), grading 2.63 mi. F. A. I. Rte. 8 between 2.3 mi. and 5.3 mi. east of Lawrenceville, Sect. 51-24A, Proj. I-08-4(7), Dist. 7, Lawrence Co.;

Ill.—**R. A. Cullinan & Son**, Tremont, Ill., LB $141,707 (1 bidder), resurf. 5.04 mi. Ill. Rte. 116 from Roanoke northeasterly, S. B. I. Rte. 116, Sect. 108RS Proj. F-395(7), Dist. 3, Woodford Co.; LB $78,412, (1 bidder), surf. treat. 3.94 mi. F. A. S. 572, from ½ mi. west Easton, southerly, Sect. 28Q, Proj. S-145(3), Dist. 6, Mason Co.;

Ill.—**J. P. Constr. Co.**, 1750 State St., Chicago Heights, Ill., LB $143,597 (1 bidder), concrete base and wid'n. 5.04 mi. Ill. Rte. 116 from Roanoke northeasterly S. B. I. Rte. 116, Sect. 108W, Proj. F-395(7), Dist. 3, Woodford Co.;

Ill.—**Crown Rock Asphalt Co.**, 178 Addison, Elmhurst, Ill., LB $117,930 (3 bidders), b. conc. resurf. 1.58 mi. West Jefferson Street (U. S. Rte. 52) from near Larkin Ave. to Wilcox St. in Joliet F. A. Rte. 72, Sect. 128RS, Proj. U-190(11), Dist. 1, Will Co.;

Ill.—**Rockford Blacktop Constr. Co.**, Rockford, Ill., LB $95,258 (3 bidders), grav. or crushed stone base 1.01 mi. and 2.4 mi. bit. surf. treat. on frontage roads right and left of U. S. Rte. 51 from Sandy Hollow Rd., south of Rockford southerly, S. B. I. Rte. 70, Sect. 105 R1-1, Proj. F-142(3), Dist. 2, Winnebago Co.;

Ill.—**Wood-Mar Constr. Co.**, Eureka, Ill., LB $82,605 (2 bidders), grav. or crushed stone surf. course 2.32 mi. from 2½ mi. northwest of Cazenovia, westerly, F. A. S. Rte. 366, Sect. 25-G-1, Proj. S-356(3), Dist. 3, Woodford Co.;

Ill.—**Powers-Thompson Co.**, 27 So. Chicago, Joliet, Ill., LB $559,799 (3 bidders), concrete base course 1.59 mi. west Jefferson Street (U. S. Rte. 52) from near Larking Ave. to Wilcox St. in Joliet, F. A. Rte. 72, Sect. 128W, Proj. U-190(11), Dist. 1, Will Co.; LB $1,399,666 (4 bidders), c. conc. 3.81 mi. U. S. Rte. 66 from DuPage-Will Co. line; northeasterly to approx. 0.6 mi. beyond Madden Road, Sect. 22-2, FAI Rte. 3, Proj. 1-03-6(7), Dist. 1, Dupage Co.;

Ill.—**Seneca Petroleum Co.**, 439 W. 33rd, Chicago, Ill., LB $288,078 (10 bidders), bit. resurf. 19.28 mi. U. S. Rte. 66 (southbound lane) between Sherman and Lincoln R. A. I. Rte. 3, Sect. (54-3 & 84-1) RS, Dist. 6, Sangamon and Logan Counties;

Ill.—**Bituminous Oil & Fuel Co.**, 1st Nat'l. Bank Bldg., E. St. Louis, Ill., LB $199,813 (1 bidder), bit. surf. treat., grav. 2.68 mi. from Randolph-Perry Co. line ½ mi. northwest of Coulterville, northeasterly, F. A. S. Rte. 835, Sect. 43Q, Proj. S-367(2), Dist. 9, Perry and Washington Counties;

Ill.—**Berry Constr. Co.**, 945 W. Pershing, Decatur, Ill., LB $312,340 (5 bidders), bit. surf. treat. 6.4 mi. from Ill. Rte. 123, north of Alexander, westerly, F. A. S. Rte. 613, Sect. 34Q, Proj. S-71(6), Dist. 6, Morgan Co.;

Ill.—**Cephas Williams Co.**, 914 E. Main, Streator, Ill., LB $101,148 (3 bidders), b. conc. resurf. 5.62 mi. Rte. 116 between Pontiac and U. S. 51, Dist. 3;

Ill.—**Maclair Asphalt Co.**, 6000 Collinsville, E. St. Louis, Ill., LB $106,607 (2 bidders), resurf. and patching 3.8 mi., Dist., 8-1957-3, Madison and St. Clair Counties;

Ill.—**J. P. Wetherly Co.**, Ottawa, Ill., LB $99,988 (4 bidders), wid'n. 1.52 mi. Ill. Rte. 29 in and north of Henry, S. B. I., Rte. 29, Sect. 20 (W, RS), Proj. F-7 (22), Dist. 4, Marshall Co.;

Ill.—**Frank C. Feutz Co.**, Paris, Ill., LB $131,743 (1 bidder), grav. or crushed stone 2.44 mi. from Ill. 1 at West Union, westerly F. A. S. 691, Proj. S-142(3), Dist. 5, Clark Co.;

Ill.—**Huckaba & Sons Co.**, Maltoon, Ill., LB $135,654, (3 bidders) b. conc. 4.58 mi. from north limits Mattcor, north, F. A. S. Rte. 671, Proj. S-3 230(2), Dist. 5, Coles Co.;

Ill.—**R. W. Dunteman Co.**, Bensenville, Ill., LB $82,621 (4 bidders), grav. or crushed stone base course 1.22 mi. from Arlington Heights Road ½ mi. north of Itasca, east, F. A. S. Rte. 147, Sect. 153G, Proj. S-737(3), Dist. 1, DuPage Co.;

Ill.—**H. H. Maas Constr. Co.**, Algonquin, Ill., LB $104,830 (2 bidders), c. conc. 0.67 mi. F. A. Rte. 6 from approx. ½ mi. south of Kane-McHenry Co. line southeasterly, Sect 10R, Proj. F-613(5), Dist. 1, Kane Co.;

Ill.—**Elgin, Giertz-Melahn Asphalt Co.**, 57 Douglas Ave., Elgin, Ill., LB $137,912 (5 bidders), b. conc. resurf. 9.93 mi. Ill. Rte. 31 between St. Charles and Elgin and on Ill. Rte. 25 from Elgin, approx. 2½ mi. southerly, Dist. 1, Kane Co.;

Ill.—**Coggeshall Constr. Co.**, Clayton, Ill., LB $275,229 (1 bidder), bit. resurf. 14.34 mi. on various routes, Adams Co. and Dist. 6;

Ill.—**Franklin Asphalt Co.**, Benton, Ill., LB $120,288 (2 bidders), bit. surf. treat., base strengthening 12.1 mi. Dist. 9. CD 7/23.

Arcole Midwest Corp., 3225 Main St., Evanston, Ill., LB $244,145, paving W. Devon Ave. from N. Western Ave. to Broadway, CHICAGO, ILL. City, City Hall. Chicago, Ill. CD 7/15.

Robert A. Black, Inc., 13912 S. Halsted St., Chicago, Ill., CA $146,960, b. conc. paving 3 parking sites, (a) No. 38, (b) No. 80, (c) No. 81, CHICAGO, ILL., City, City Hall, Chicago, Ill. Bids July 1. CD 6/24.

White Constr. Co., 300 W. Washington St., Chicago, Ill., LB $163,994, paving N. Marine and W. Wilson Drives, CHICAGO, ILL. Chicago Park Dist., 425 E. 14th Blvd., Chicago, Ill. Bids July 26. CD 7/18.

▲ **Sollitt Constr. Co.**, 301 Columbia St., South Bend, Ind., CA $1,366,453 est. $985,000, sewage treatment plant addn., DANVILLE, ILL. Danville Sanitary Dist., P. O. Box 724, Danville, Ill. Bids June 15. CD 6/17.

Arcole Midwest Corp., 3225 Main St., Evanston, Ill., LB $170,094, wid'n., paving Emerson St. from Ashland to Asbury; Maple Ave. from Church to Foster; Asbury from Emerson to Green Bay, Sec. 52-cs., EVANSTON, ILL. City, City Hall, Evanston, Ill.

▲ **V. Jobst & Sons**, Lehmann Bldg., Peoria, Ill., CA $1,076,264, terminal bldg. at Greater Peoria Airport, PEORIA, ILL., Greater Peoria Airport Auth., Harman Hy., Peoria, Ill.

WISCONSIN—State Hy. Commission, State Office Bldg., Madison,

White Constr. Co., 828 N. Broadway, Milwaukee 2, Wis., CA $738,058, c. conc. base and b. conc. surf. 0.952 mi. Projs. U 02-2 (19) and U 064-1 (8) Contr. 1 S. 27 St. (West Loomis Road to West Oklahoma Ave.) and West Loomis Road (South 32 St. to South 27 St.) U. S. Hy. 41 and S.Y. Hy. 36, Milwaukee Co. Bids July 2. CD 7/10, under LB.

WISCONSIN—State Hy. Comn., State Office Building, Madison,

Streu Constr. Co., Two Rivers, Wis., CA $672,907, imprv. 3.844 mi. South County Line-Millhome-Kiel Rd. and East Water St. in Kiel, Proj. F 02-4 (16) and T 02-4 (19) St. Hys. 57 and 32, Contr. 1, Manitowoc Co. Bids May 7. CD 5/13, under LB.

Guy Hively, 140 Apple St., Muskegon, Mich., CA $291,950, Contr. 1 Section A, water mains, ALPENA, MICH. City, Edward E. Seguin, city clk., Alpena, Mich. Bids June 19. CD 6/10;

John Longo, 14656 Cedergrove St., Detroit, Mich. CA $535,494, Contr. 1, Section B, water mains, (Alpena, Mich.).

Howell Constr. Co., Rte. No. 3, Howell, Mich., CA $135,599, est. $183,000, b. conc. and bit. aggreg. Silver Lake Rd. US-10 to Walton Blvd., Pro. 218,

(Continued on page 133)

DUMPCRETES help solve heavy traffic problem on DETROIT EXPRESSWAY job

The Cooke Contracting Company worked Dumpcretes during off-peak traffic hours to average 2500 feet of concrete pavement per day in widening Detroit Industrial Expressway. Highway Department check showed 500 vehicles passing the paving site *each hour*. 14 miles of 8′ to 12′ widths totalled 110,000 sq. yds.—hauled and placed by 6 Dumpcretes from central plant.

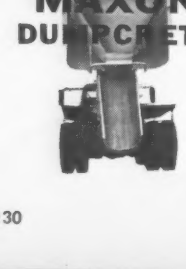
GET MORE FACTS ON THIS JOB BY SENDING COUPON

Dumpcretes can reduce:

Capital investment in equipment • Confusion at paving site • Downtime and labor costs • Wide shoulder maintenance.

Dumpcretes can give you:

Lower operating costs • *Flexible* delivery to paving site *and* structures • Closer quality control • Better production.



MAXON CONSTRUCTION COMPANY, INC.
Manufacturing Division 17
2600 Far Hills Building, Dayton 9, Ohio

Please send me new Dumpcrete Field Report.

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New Facilities to do a better job for you

During the past six months Levinson has been undergoing a major expansion program designed to meet the increasing demands of its customers for plain and fabricated steel.

New warehousing facilities have been acquired in McKees Rocks, Pa. and the company is in the process of adding new, modern equipment for cutting and fabricating. All of this adds up to an even better job for Levinson customers.

On your next order for plain or fabricated steel

just . . . Leave it to **LEVINSON**

Warehousers, fabricators, designers of steel for over half a century

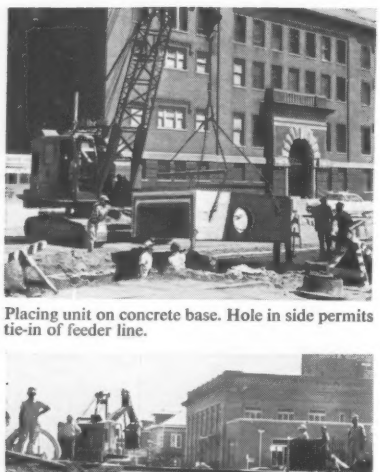
the LEVINSON STEEL COMPANY

Pittsburgh 3, Pa.
Phone: HUbbard 1-3200

Constructing special section of storm sewer in downtown Hutchinson. A total of 225 precast rectangular units (10′ x 8′ x 2¾′) were used, each weighing 9 tons. Note units on left ready for placement.

LEHIGH EARLY STRENGTH CEMENT

speeds storm sewer project . . .



Placing unit on concrete base. Hole in side permits tie-in of feeder line.

Quartzite Stone Co., Lincoln, Kansas, manufactured arched and round pipe used in all other sections of system.

To meet unusual excavation requirements, specially designed rectangular precast concrete units were used for a 2250 ft. section of the new Hutchinson, Kansas, storm sewer system.

Using Lehigh Early Strength Cement, the contractor cast units one day, stripped forms the next. Form, curing and general overhead costs were cut, and units were moved to jobsite in half the time required had regular portland cement been used.

Lehigh Early Strength Cement was also used in parts of the cast-in-place base for the pipe and in resurfacing street intersections, to keep the entire job moving smoothly, to cut down annoying detours.

This is another example that gives us reason to say "Somewhere on nearly every job Lehigh Early Strength Cement will save time and money."

Contractor: J. H. Shears Sons, Inc., Hutchinson, Kansas

Engineer: Ray Bruggeman, City Engineer, Hutchinson, Kansas

Ready Mixed Concrete: Shears Ready Mix Concrete Co., Hutchinson, Kansas

- LEHIGH EARLY STRENGTH CEMENT
- LEHIGH PORTLAND CEMENT
- LEHIGH MORTAR CEMENT
- LEHIGH AIR-ENTRAINING CEMENT

LEHIGH PORTLAND CEMENT COMPANY

Allentown, Pa.

(Continued from page 130)

Lashser Rd. Maple Rd. to Lang Lake Rd., Pro. 219, Grange Hall Rd., Jaooman Rd. east to M-15, Pro. 229, Crescent Lake Rd. from M-59 to Hatchery Rd. Pro. 236, PONTIAC, MICH. Oakland Co. Bd. Rd. Comn., 2420 Pontiac Lake Rd., Pontiac, Mich. Bids June 20. CD 6/19.

BUILDINGS—LB & CA

▲ **Cleveland Transit System,** 1404 E. 9 St., Cleveland, O., cancelled bids to have been opened July 26, BUS GARAGE, Lakewood Heights Blvd., CLEVELAND, O. Est. $1,500,000. CD 6/26.

▲ **H. L. Vokes Co.,** 1000 Wayside Rd., Cleveland 19, O., CA $5,000,000. design and construct 10 story, air-conditioned OFFICE, 3101 Euclid Ave., CLEVELAND, O. Syndicate of Investors, Halley H. Lipp, pres., 2829 Euclid Ave., Cleveland 15, O.

Floyd P. Bucher, 5310 Dorr St., Toledo, O., Est. $95,000. FACTORY addn., TOLEDO, O. Bingham Stamping Co., 5511 Telegraph Rd., Toledo, O.

▲ **Chemical Constr. Corp., Inc.,** 525 W. 43 St., New York, N. Y., CA $1,000,000, 1 story, brick sulphuric acid mfg. PLANT on premises, HAMMOND, IND. Stauffer Chemical Co., 5801 Indianapolis St., Hammond, Ind. Hutton & Hutton, 5231 Hohman Ave., Hammond, Ind., archts.

▲ **Sollitt Constr. Co.,** 301 S. Columbia St., South Bend, Ind., LB $1,846,617, 1 story, 300,000 sq. ft. FACTORY BLDG., MISHAWAKA, IND. Bendix Aviation Corp., 400 S. Belger St., Mishawaka, Ind. Bids July 30. CD 7/17.

Hope Constr. Co., 3520 No. Knox Ave., Chicago 41, Ill., CA Est. $500,000. WAREHOUSE, Kolin Ave., CHICAGO, ILL. Fort Wayne Corrugated Paper Co., E. Water St., Hartford City, Ind. Bids June 25. CD 6/20.

Decamp Assocs., Inc., 6744 N. Sheridan Rd., Chicago, Ill., CA $150,000, PLANT, 4101 N. Rockwell St., CHICAGO, ILL. Illinois Creamery & Supply Co., 717 S. Damen Ave., Chicago, Ill. James Metcoff, 6744 N. Sheridan Rd., Chicago, Ill., archt. CD 7/29/53.

Northern Builders, 4008 W. Addison St., Chicago, Ill., CA $320,000, 1 story, brick FACTORY addn., 3200 S. Kilbourn Ave., CHICAGO, ILL. Trio Bldg. Corp., 2417 W. 19 St., Chicago, Ill. N. Ronneberg, 2906 N. Harlem Ave., Chicago, Ill., archt.

▲ **Robert G. Regan Co.,** 201 N. Ottawa, Joliet, Ill., LB $1,079,500, 1 and 2 story Tech Vocational SCHOOL, Hearkimer St. and Van Buren, JOLIET, ILL. School Dist. 204, 201 E. Jefferson St., Joliet, Ill. Levon Seron, 81 N. Chicago Ave., Joliet, Ill., archt. CD 1/10/52.

W. A. Kutsche & Co., 6275 Schaefer St., Dearborn, Mich. CA $576,000, EAST WING addn., alterations, DETROIT, MICH. Holy Cross Hospital, 4777 East Outer Dr., Detroit 34, Mich. Bids June 24. CD 7/19, under LB.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

Colo., Colorado Springs—BA 8/21—City, City Hall, 9 m. g. water filtration plant, $300,000. Black & Veatch, 1500 Meadow Lake Parkway, Kansas City, Mo., archts.

† **N. M., Las Cruces**—WATER SUPPLY—BA About 8/27—U. S. Eng., P. O. Box 1538, Albuquerque, water supply, Las Cruces Air Force Station, ENG-29-005-58-4.

† **Colo., Colorado Springs**—INCINERATOR—BA 9/3—Dpt. Air Force, P. O. Box 1670, incinerator, incl. constr. 3,640 sq. ft. bldg., Air Force Academy (IFB) 05-613-58-5. Skidmore, Owings & Merrill, 3333 N. El Paso St., engrs.-archts. CD 8/5/54.

† **Kansas**—BA On Or About 9/4—U. S. Eng., 1800 Federal Office Bldg., 199 Walnut St., Kansas City 6, Mo., levee, channel and appurtenances, Stage 1, Abilene, CIVENG-23-028-58-13.

† **N. M., Roswell**—NCO CLUB, etc.—BA About 9/4—U. S. Eng., P. O. Box 1538, Albuquerque, NCO Club, sprinkler system and curbing, Walker Air Force Base, ENG-29-005-58-11. CD 10/20/55.

† **New Mexico**—BA 9/5—Bureau Reclamation, Dpt. Interior, Albuquerque, earthwork, clearing and structures, Belen Unit 5, Middle Rio Grande Proj., near Belen, Spec. No. 4949, adv. ENR 8/15. CD 9/4.

† **New Mexico**—BA 9/17—Bureau Reclamation, Dpt. Interior, Albuquerque, channelization of Rio Grande, Socorro Area, Middle Rio Grande Proj., north of Socorro, Spec. DC 4951; adv. ENR 8/15. CD 9/4/56.

† **Colo., Colorado Springs**—FIRE STATIONS—BA 9/19—Dpt. Air Force, Box 1670, two fire stations, one approx. 4,730 sq. ft. and other 4,760 sq. ft. (IFB) 04-613-58-8. Skidmore, Owings & Merrill, 3333 N. El Paso St., engrs.-archts. CD 8/5/54.

† **Colo., Colorado Springs**—BA 10/2—Dpt. Air Force, Box 1670, academic area paving Air Force Academy, IFB. 5-613-58-6. Skidmore, Owings & Merrill, 3333 N. El Paso St., engr. CD 8/5/54.

† **Colo., Colorado Springs**—LANDSCAPING—BA On Or About 2/4—Contg. Officer, Air Force Academy Constr. Agency, P. O. Box 1670, Colorado Spring, landscaping, BOQ-VOQ and staff club on Air Force Academy site, approx. 8 mi. north of here, IFB 05-613-58-9. Plans deposit $5. CD 8/5/54.

BUILDINGS—BA

▲ **Mo., Hannibal**—SCHOOLS—BA 8/20—Hannibal Public Schools Dist. 60, Marion Co., E. T. Miller, supt. Schools, 1020 Broadway, 1 and 2 story Junior High School bldg., McMasters Ave. and Palmyra Rd.; elementary school bldg., Hatch Ave. between Market

STANDARD AND OPTIONAL EQUIPMENT

On Leading Diesel Trucks, Tractors & Stationary Engines

Luber-finer

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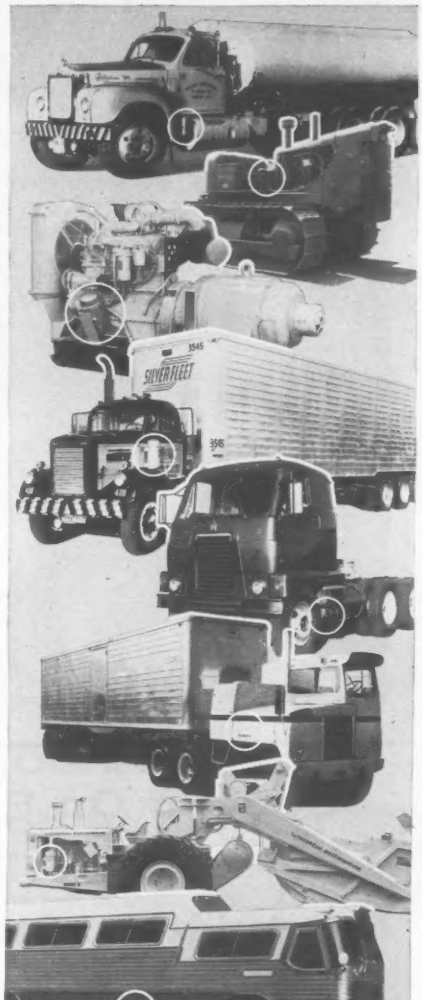
Only Luber-finer Filters produce the patented filtering process that gives engineered protection to engine and oil as recommended by equipment manufacturers. The vital oil supply is circulated through Luber-finer's exclusive specially processed media which removes not only the injurious suspended solids from the oil but also the colloidal impurities which are often more damaging, thus increasing the life of both engine and oil.



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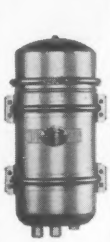
Luber-finer's patented filtering process adds thousands of miles to engine and oil life by cleaning oil faster and keeping it clean longer. Luber-finer gives more service and engineered protection than any other filter unit.

FOR EVERY TYPE OF ENGINE ...EVERY TYPE OF OIL



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DIESELPAK — Designed expressly for use with H. D. detergent compounded oils. The Dieselpak is unequalled in efficiency in removing impurities and contaminants without affecting the additives. (May also be used with fuel oil and straight mineral oil if desired).

REFINING PACK — Designed for use with straight mineral oils, fuel oils, hydraulic oils and inhibited industrial oils. The Refining Pack, combines ABsorbent with ADsorbent filtration, removes acids, moisture, suspended particles and colloidal impurities during its effective life more efficiently than any other filter and has been the standard of the industry since 1936.

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LUBER-FINER, INC. 2514 S. Grand Ave., Los Angeles 7, Calif.

St. and Tilden Ave., and new Vocational and Fine Arts Bldg., on High School Campus. $2,100,000. William B. Ittner, Inc., 408 Bd. Educ. Bldg., 911 Locust St., St. Louis, Zone 1, archt.-engr. CD 3/1.

▲ **Tex., Galveston**—PACKAGING CENTER—BA 8/26—Falstaff Brewing Corp., 3312 Church St., packaging center at owners No. 8 Plant and bottling plant expansion $1,250,000. O. W. Stiegemeyer, No. 3 Sheraton Dr., St. Louis Mo., and R. R. Rapp, 417 Stewart Bldg., Galveston, Tex., archts. CD 6/28.

† **N. M., Las Cruces**—OPERATIONS—BA About 8/28—U. S. Eng., P. O. Box 1538, Albuquerque, 40x120 ft. dart operations bldg., White Sands Proving Grounds, ENG-29-005-58-19.

BUILDINGS—SLC

▲ **Mo., Jefferson City**—HOSPITAL—Memorial Hospital Bldg. Comm., soon lets contract, 2 and 4 story, hospital bldg. addn., and 160 car parking lot. $1,000,000. Hewitt & Royer, 607 Westport Rd., Kansas City, Mo., archts. and engrs. CD 7/16.

▲ **Tex., Houston**—HOSPITAL—Texas Institution for Rehabilitation & Research, c/o Wilson, Morris, Crain & Anderson, archts., 3330 Graustark St., soon lets contract, rehabilitation and research bldg. at Texas Medical Center Zone. $1,350,000. Dale S. Cooper & Assocs., 3815 Garrott St., and Walter P. Moore, 2 Pinedale St., engrs. CD 7/30.

Tex., Lancaster—AUTO AGENCY—Bob Jenkins, Lancaster, soon lets contract, auto agency, shop, parts, storage, paint, etc. $125,000. Erwin & Willimon, 2713 Canton St., Dallas, archts.

HEAVY CONSTRUCTION—LB & CA

Parsons Electric Co., 917 Fifth Ave. South, Minneapolis, Minn., LB **$232,512** (6 bidders), convert DC to AC at General Hospital, Portland Ave. and South Fifth St., MINNEAPOLIS, MINN. City, G. R. Arneson, city purch. agt., 253 City Hall, Minneapolis, Minn. T. E. Roche, 517 Sexton Bldg., Minneapolis, Minn., engr. Bids June 12. CD 5/1/47, under Public Bldgs.

Bd. Trustees of Water Wks., Samuel O. Erhardt, secy., Ottumwa, Iowa, rejected bids July 16, Contr. W-3 primary and secondary water basins, incl. 2 flash-mixing, 8 flocculation, 4 settling, 2 recarbonation basins, yard and basin piping, control structures, etc., OTTUMWA, IOWA. Will re-advertise. CD 7/8.

Norris Constr. Co., Ottumwa, Iowa, CA **$134,024**, (3 bidders) rolled stone base and bituminous surf. 3.49 mi. County Road C from Mechanicsville south and east and 4.225 mi. County Road H, Lowden to Massillon, TIPTON, IOWA, Cedar Co., Court House, Tipton, Iowa. H. L. Lyon, Court House, Tipton, Iowa, co. engr. Bids July 22.

▲ **MISSOURI**—State Hy. Comn., Jefferson City. Bids opened 7/25,

Mo.—Millstone Constr. Co., 8510 Eagan Rd., St. Louis, Mo., LB **$1,720,960**, c. conc. 0.886 mi., St. Louis Co.;

Mo.—Griesemer Constr. Co., Rte 2, Box 246, Springfield, Mo., LB **$74,461**, granular surf. 4.096 mi., Pulaski Co.;

Mo.—George R. Lemon, 817 E. Monroe, Kirkwood, Mo., LB **$99,913**, granular surf. 7.394 mi. St. Charles Co.;

Mo.—Ray P. Stephans & C. E. Rich, Elsberry, Mo., LB **$73,628**, granular surf. 4.221 mi., Perry Co.;

Mo.—Arthur E. Quinn Contractor, Salisbury, Mo., LB **$85,729**, granular surf. 7.677 mi. Ray Co.;

Mo.—Cameron Constr. Co., Inc., 1410 Dixon Dr., Jefferson City, Mo., LB **$81,993**, granular surf. 8.53 mi., Harrison Co.;

Mo.—Arco Contg. Co., 310 S. Filmore, Kirkwood, Mo., LB **$83,806**, granular surf. 8.396 mi., Franklin Co. CD 7/25.

▲ **MISSOURI**—State Hy. Comn., Jefferson City. Bids opened 7/25,

Joseph Pohl Contr. G. L. Tarlton Contr. Co. & Henry L. Perkinson Constr. Co., 132 E. Douglas St., St. Louis Mo., LB **$412,756** (6 bidders) one 198 ft., one 120 ft., rein.-con. box girder spans LB **$239,952** (6 bidders) one 107 ft., one 100 ft. rein.-con. box girder spans; LB **$368,885** (6 bidders) one 122 ft., two 74 ft. rein.-con. box girder spans; LB **$216,162** (6 bidders) one 61.6 ft., one 70.6 ft., one 43.5 ft. rein.-con. box girder spans; LB **$129,201** (6 bidders) retaining walls, all above work in St. Louis Co. CD 7/16.

† **Markham & Brown**, 1916 N. Industrial Blvd., Dallas, Tex., LB. **$476,190**, est. $521,622, repair dike and revetment from Isabel to Washington Counties, Missouri River, CIVENG-23-028-57-131, MISSOURI. U. S. Eng., Federal Office Bldg., Kansas City, Mo. Bids July 30.

† **Pine Bluff Sand & Gravel Co.**, Foot of Nebraska St., Pine Bluff, Ark., LB **$385,735**, est. $475,500, constr. and repair dike and revetment from Rulo to St. Joseph Bends, CIVENG-23-028-58-2, Missouri River, MISSOURI, U. S. Eng., Federal Office Bldg., Kansas City, Mo. Bids July 25.

† **Porter DeWitt Constr. Co.**, Poplar Bluff, Mo., LB **$261,860**, est. $256,125, relocation of State Hy. 86 from Hy. 39 to Berry-Stone Co. line, White River, Table Rock Reservoir, CIVENG-03-050-57-51, MISSOURI. U. S. Eng., P. O. Box 867, Little Rock, Ark. Bids July 23. CD 7/12.

Jacob Rubin & Sons, Buder Bldg., 707 Market St., St. Louis 1, Mo., LB **$104,298**, est. $100,000 (8 bidders) 1 story, 62x117½ ft. structural tile, steel, concrete precast, concrete roof slabs, etc., golf course service bldg., Lagoon Dr., in Forest Park, ST. LOUIS, MO., City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12th Blvd. and Market St., St. Louis 3, Mo. Bids July 23, CD 6/28.

Hedges Constr. Co., 409 N. Lexington Ave., Springfield, Mo., CA **$108,389**, sewers in Dist. 94, Sect. 2, east city limits from Glenntone to Barnes Lane, SPRINGFIELD, MO. City, Bart Avery, mgr., City Hall, Springfield, Mo. Bids June 19. CD 8/28/55.

† **H. Halvorson, Inc.**, E. 5019 Sprague St., Spokane, Wash., CA **$507,963**. ready aircraft shelters, Grand Forks Air Force Base, Inv. 25-066-57-95, GRAND FORKS, N. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids July 18. CD 7/29, under LB.

† **Bison Constr. Co.**, Grand Forks, N. D., LB **$351,811** (4 bidders) SAC utilities Grand Forks Air Force Base, Inv. 25-066-57-84, GRAND FORKS, N. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids July 26. CD 7/8.

Haggart Constr. Co., Fargo, N. D., LB **$124,818** (4 bidders) paving, guttering and curbing, MANDAN, N. D. City, City Hall, Mandan, N. D. Bids July 20.

Commonwealth Electric Co., 1906 Y St., Lincoln, Neb., LB **$367,023** sub-station, Lincoln, NEBRASKA. Loup River Public Power Dist., Columbus, Neb. Bids July 25, CD 5/2/56;

Elliott Constr. Co., Redick Tower Bldg., Omaha, Neb., LB **$74,578**, sub-station, Beverly, near McCook (Nebraska).

Francis Orshek Co., Fremont, Neb., LB **$255,666**, est. $153,000, bridge over Nemaha River, FALLS CITY, NEB. Richardson Co., Falls City, Neb. Harold Hoskins & Assocs., 1630 Q St., Lincoln, Neb., engrs. Bids July 25. CD 7/8.

KANSAS—State Hy. Comn., State Office Bldg., Topeka, rejected bids July 18, bit. sealing 3.03 mi. SP 58-46-1725 AB (4); A-B base course; single b. surf. treat. (stab. shoulders) 0.161 mi. SP 69-46 K 1291 (2); A-B base course, single b. conc. surf. treat. (stab. shoulders) 2.004 mi. SP 169-46 K 1292 (2) Johnson Co.; bit. sealing 3.497 mi. SP 32-52-1726 (4), Leavenworth Co.; bit. sealing 1.077 mi. SP 32-105-1730 (4), Wyandotte Co.; bit. sealing 0.79 mi. SP 40-105-1731 (4), Wyandotte Co.; grading, b. conc. 0.956 mi. SP-23 F 067-2 (13), Douglas Co. CD 7/16.

Freeto Asphalt Co., Inc., RFD No. 1, Pittsburg, Kan., LB **$138,179**, Est. $139,710, South Side Paving Proj. P.-22, incl. 14,695 lin. ft. curb and gutter, 3,558 sq. yd. 6 in. c. conc. paving, 22,098 sq. yd. 2 in. b. conc. surf. on 6 in. AB-3 rock base, etc., COFFEYVILLE, KAN. City, Joseph Waller, city clerk, Coffeyville, Kan. Bids July 16. CD 5/29.

H. D. Sharp Constr. Co., P. O. Box 313, Denison, Tex., LB **$153,000**, est. $130,000, brick, tile, REA headquarters bldg., air-conditioned 4587 sq. ft. office

(Continued on page 137)

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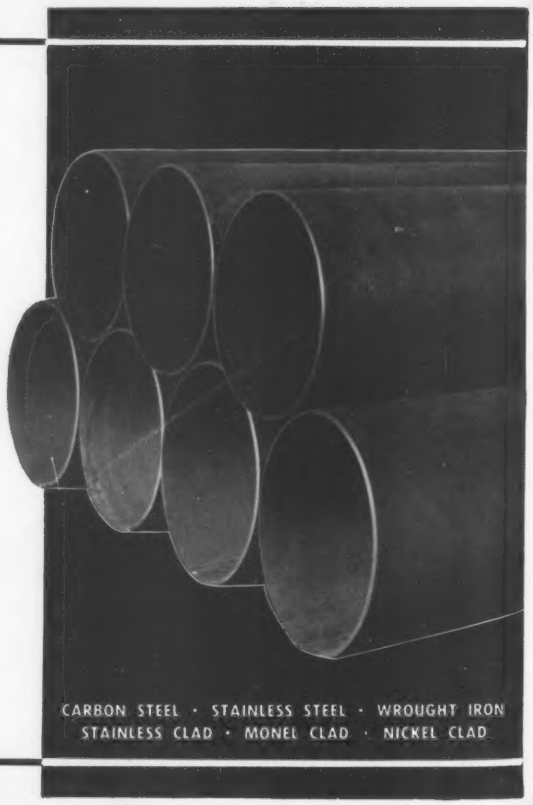

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23-year-old ALCOA ALUMINUM bridge railing still on the job at Laredo

Every time floods sent the Rio Grande rampaging past Laredo, Texas, International Bridge authorities had troubles. The climax came in 1932, when roaring water tore out the original concrete railing. Then came a startling development. . . .

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City of Dearborn, Michigan, Saves Money With Sherman Digger-Loader

The City of Dearborn's Water Department has found its Sherman Major Digger-Loader combination to be one of the most versatile pieces of equipment it owns.

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Once the excavation is completed, the Loader takes over. Loading trucks with a fast cycling Sherman Loader, cleaning up around a job, backfilling, grading and levelling, stripping . . . all are performed quickly and economically with the same basic piece of equipment which was used to dig the hole *and* by the same operator.

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(Continued from page 134)

space and 41,000 sq. ft. service section, DECATUR, TEX. Wise Co. Electric Co-operative, c/o A. L. Duncan, mgr., Decatur, Tex. Bids July 31, CD 7/19.

H. B. Zachry Co., c/o Constr. Div., Box 10188, San Antonio, Tex., LB **$292,918**, street imprvs., incl. 93,500 sq. yd. overlay on existing pavement, 57,400 lin. ft. curb and gutter, concrete structures, etc., KENEDY, TEX. City, City Hall, Kenedy, Tex. Frank T. Drought, 342 W. Woodlawn St., San Antonio, Tex., engr. Bids July 23. CD 11/20.

Pioneer Paving, Inc., Lubbock, Tex., CA **$279,709**, street paving, 43,000 lin. ft. concrete curb and gutter, LUBBOCK, TEX. City, City Hall, Lubbock, Tex. Bids June 28. CD 2/8.

Wm. J. Graham & Son, c/o Gary Army Air Field, San Marcos, Tex., cancelled bids to have opened June 20, classroom bldgs., incl. site work Gary Air Force Base, SAN MARCOS, TEX. Est. **$100,000.** CD 6/19.

Bonneville Constr. Co., Idaho Falls, Idaho, CA **$192,000.** constr. 16 mi. telephone line from Carter to Flaming Gorge Dam site on Green River, MOUNTAIN VIEW, WYO. Union Telephone Co., Mountainview, Wyo.

COLORADO—State Hy. Dpt., 4201 E. Arkansas St., Denver.

James B. Kenney Inc., 3233 Osage St., Denver, Colo., LB **$589,442**, est. $392,000. 5 structures 0.054 mi. State Hy. No. 2, Idaho Springs, Colo. Proj F 005-3 (9), Unit 2, Clear Creek Co. Bids July 30. CD 7/24.

▲ **B & L Constructors**, Box 1546, Pueblo, Colo., CA **$1,631,612**, 115-kv transmission line, Nucla, COLORADO Colorado-Ute Electric Assn., Inc., Montrose, Colo. Bids Apr. 30. CD 5/7, under LB.

▲† **Robert E. McKee**, P. O. Drawer 562, El Paso, Tex., CA **$2,157,300**, retaining wall facing, Air Force Academy, IFB-05-613-57-39, COLORADO SPRINGS, COLO. Dpt. Air Force, Box 1670, Colorado Springs, Colo. Bids July 23, awarded July 26. CD 7/30, under LB.

Martinson Constr. Co., 5400 Colorado Blvd., Denver, 16, Colo., CA **$209,875**, Street Imprv. Dist. No 1027, DENVER, COLO. City and Denver Co., City & County Bldg., Denver, Colo. Bids June 18.

Peter Kiewit Sons' Co., 1950 S. Colorado Blvd., Denver, Colo., CA **$205,337**. Street Imprvt. Dist. 1030, concrete curbs, gutters, sidewalks, grav. base course, b. conc. paving, DENVER, COLO. City and Denver Co., City & County Bldg., Denver, Colo. Bids June 27.

The Brannan Sand & Gravel Co., 4800 Brighton Blvd., Denver 16, Colo., CA **$153,671**, Street Imprvt. Dist. 1031, concrete curbs, gutters and sidewalks, grav. base courses b. conc. paving, DENVER, COLO. City and Denver Co., City & County Bldg., Denver, Colo. Bids June 28.

Peter Kiewit Sons Co., 1950 S. Colo. Blvd., Denver, Colo., CA **$262,899**, paving approx. 50 blocks, Streets Dist. No. 7, ENGLEWOOD, COLO. City, City Hall, Englewood, Colo. Bids June 17, CD 6/12.

BUILDINGS—LB & CA

Kahlmeyer Bros., Inc., 5063 Manchester Ave., St. Louis 10, Mo. Owner Builds, **$143,680**, 125 x 150 ft. brick MANUFACTURING PLANT, Warson Rd. north of Rock Island Tracks, ST. LOUIS COUNTY, MO.

Kloster Co., 4607 Beck Ave., St. Louis 16, Mo., CA est. **$750,000**, Lindbergh HIGH SCHOOL addn., incl. 14 classrooms and physical educ. unit, etc., 4900 S. Lindbergh Blvd., ST. LOUIS COUNTY, MO. School Dist. R-3, St. Louis Co., Noah Gray, supt. Schools, 4900 S. Lindbergh Blvd., St. Louis 23, Mo., Charles W. Lorenz, 700 N. Ballas Rd., Kirkwood 22, Mo. archt. CD 4/11.

Geo. Moeller Constr. Co., 3007 Wyoming St., St. Louis 18, Mo., LB **$457,236**, (10 bidders) general contract, 1 story, 30,000 sq. ft. masonry blocks, steel concrete, etc., 2 SUPERMARKETS, one at U.S. 66, and Lindbergh Blvd., and other at St. Charles Rock Rd. and Airway Ave. both in ST. LOUIS COUNTY, MO. Bids July 25, CD 7/8.

Burt Wennekar, 6 Ladue Forest St., Ladue 23, Mo., Owner Builds, **$350,000**, 26 RESIDENCES, on 13.35 acre tract east side of Lindbergh Blvd. near Conway Rd., in Lylewood Subdivision, ST. LOUIS COUNTY, MO.

Southwest Concrete Materials Corp., National Old Line Bldg., Little Rock, Ark. Owner Builds. **$550,000**, PLANT, POYEN, ARK.

▲ **Jones Stores, Inc.**, c/o Jones Constr. Dpt., Kansas City, Mo., Separate Contracts, **$1,500,000**, 2 story suburban STORE, incl. approx. 100,000 sq. ft. warehousing and storage space, roof top parking, PRAIRIE VILLAGE, KAN. William B. Fullerton, Jr., & Earl Co. McCamis Assoc., 15 W. 10th St., Kansas City, Mo., archts. Bids 8/1. CD 3/1.

H. D. Lewis & Angus Wynne, Jr., 401 Wynnewood Village, Dallas, Tex., Owner Builds. **$385,115**, 27 DWELLINGS, **$369,500**, 23 dwellings, FARMERS BRANCH, Tex.

Centex Constr. Co., 4606 Greenville St., Dallas, Tex., **$359,910**, Own Forces. 28 DWELLINGS, **$373,135**, 32 DWELLINGS, GRAND PRAIRIE, TEX. CD 8/14/56.

Spaw-Glass, Inc., 2411 Times St., Houston, Tex., CA **$325,000**, WAREHOUSE, PLANT, HOUSTON, TEX. Magnolia Carton Co., 6925 Clinton Dr., Houston, Tex.

John Townsend Builder, 826 Shelterwood Dr., Houston, Tex., Owner Builds. **$375,000**, 17 all masonry

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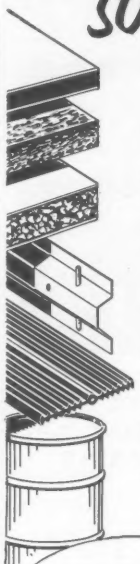

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DWELLINGS, Meyerland subdivision, HOUSTON, TEX. CD 6/24.

Mayflower Constr. Co., c/o Carr P. Collins, Jr., c/o Fidelity Union Life Bldg., Dallas, Tex., Owner Builds. $373,335, 33 frame, masonry, trim DWELLINGS, IRVING, TEX. CD 7/1.

Tynes & Burch Constr. Co., 1833 Belmont St., Dallas, Tex., CA $371,400, 36 DWELLINGS, CA $375,125, 38 DWELLINGS "Pasadena Gardens", MESQUITE, TEX. Tyners & Burch, 2633 S. Garland Ave., Garland, Tex. and c/o Fidelity Union Life Bldg., Dallas, Tex. CD 6/11.

N. R. Nielsen & Son, 75 S. Elati St., Denver, Colo., LB $390,189, 1 story JAIL for 125 prisoners, GOLDEN, COLO. Jefferson Co., Court House, Golden, Colo. Bids July 25, CD 7/19.

† **Lembke, Clough & King Inc.**, 1719 N. W. 5 St., Albuquerque, N. M., CA $634,244. STORAGE and WORKSHOP expansion, ACF Industries, Incl. plant, Inv. No. 292-57-56, ALBUQUERQUE, N. M. Atomic Energy Comn., 4001 Gibson Blvd. S. E., Box 5400, Albuquerque, N. M. Bids June 13. CD 5/2.

FAR WEST

HEAVY CONSTRUCTION—BA

† **Washington**—BA 8/22—Bonneville Power Admin., 1001 E. Lloyd Blvd., Portland, Ore., 5.6 mi. access roads and constr. McNary-Richland 115-kv line No. 1, McNary-Pasco Mile 19-Highlands section, Inv. 8500. Plans deposit $50. L. C. Stewart, c/o owner, engr.

† **Washington**—BA 8/22—Bonneville Power Admin., 1001 E. Lloyd Blvd., Portland, Ore., constr. Chief Joseph switchyard 230-kv powerhouse Line No. 1 addn. Inv. 8506. Plans deposit $25. L. C. Stewart, c/o owner, engr. CD 2/5/51.

Calif., Pomona—BA 8/28—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, site development Phase II, incl. removal of more than 250 trees, grading and paved area, etc., California State Poytechinic College, Kellogg Campus, 371GC-59 $360,000. Plans deposit $25. CD 4/24/56 under public bldgs.

† **Oregon**—BA 9/10—Bureau Reclamation, Dpt. Interior, Camp White, earthwork, concrete canal lining, structures for Howard Prairie Delivery Canal and Little Beaver Creek Canal, Rogue River Basin Proj east of Ashland, Spec. DC 4947. adv. ENR 8/15.

† **Oregon**—BA 9/10—Bureau Reclamation, Dpt. Interior, Camp White, Ore., Keene Creek Dam and Green Springs Power Conduit, Rogue River Basin Proj., 16 mi. southeast of Ashland, Jackson Co., Spec. No. DC4948; adv. ENR 8/15.

BUILDINGS—BA

Calif., Fresno—ART-HOMEMAKING, etc.—BA 8/27—State Div. Architecture, 1120 N. St., Sacramento, 2 structures, 1 wood frame and other a 3 story concrete frame 36,700 sq. ft., art-homemaking and home management cottage at Fresno State College, W.O. 371GC-4 $675,000. Plans deposit $50. CD 4/26/56.

Ore., Portland—INTERMEDIATE PENAL INSTITUTION—BA 8/27—Oregon Bd. Control, Capitol, Salem, general construction intermediate penal institution. Plans deposit $150. Annand, Boone & Lei, 1530 S.W. Taylor St., archts. CD 5/25/54.

BUILDINGS—SLC

Ore., Salem—HOSPITAL—Salem Memorial Hospital, Salem, soon lets contract, 3 story bsmnt. hospital addn. James L. Payne, 725 S. Commercial St., archt. CD 7/16.

HEAVY CONSTRUCTION—LB & CA

† **IDAHO**—State Hy. Dpt., Boise,
rejected bids July 23, constr. roadway, drainage structures, 40 ft. concrete bridge and plant mix bit. surf. 1.382 mi. N.S. 26 and State 46, Gooding Co. LB $324,770. Will readvertise. CD 7/16.

T. & S. Constr. Co., Twin Falls, Idaho, LB $165,029, constr. roadway, 4 concrete bridges and 4.905 mi. bit. surf. Aberdeen loop, BLACKFOOT, IDAHO, Bingham Co., Blackfoot, Idaho. Bids July 23. CD 7/16.

† **G. D. Dennis & Sons**, 7355 S. E. Johnson Creek Blvd., Portland, Ore., CA $365,027. relocating State Hy. 58 Lookout Point Reservoir, Lane Co., CIVENG-35-026-57-281, OREGON U. S. Eng., Pittock Block, Portland, Ore. Bids July 12, awarded July 29. CD 7/22, under LB.

C. M. Corkum Co., 2630 S.W. 2 Ave., Portland, Ore., LB $317,800 (8 bidders) rehabilitating sbip berth at Pier 5, Terminal 4, PORTLAND, ORE. Portland Dock Comm., 3070 N.W. Front St., Portland, Ore. Bids July 26. CD 7/18.

Smith-Phillips, 7402 S.W. Macadam St., Portland, Ore., LB $587,000 (5 bidders) storm sewers, heating system, trenches, roads, grading and landscaping, for Dammasch Mental Hospital near Wilsonville, PORTLAND, ORE. Oregon Bd. Control, Capitol, Salem, Ore. Bids July 30. CD 7/18.

Rainier Mechanical Contractors, Inc., Parkland, Wash., LB $196,702 (5 bidders), 4990 ft. 24 and 36 in. steel water main along Milwaukee Way, TACOMA, WASH. Port of Tacoma, Portacoma Rd., Tacoma, Wash.

CALIFORNIA—Bureau P. Rds., Regional Engr., 102 Old Mint Bldg., San Francisco,
Richter Bros., Box 511, Oroville, Calif., LB $376,288, (8 bidders) Everett Memorial Hy. Constr. (clear, grub 53 acres, excavation, grading, surf., etc.)

(Continued on page 142)

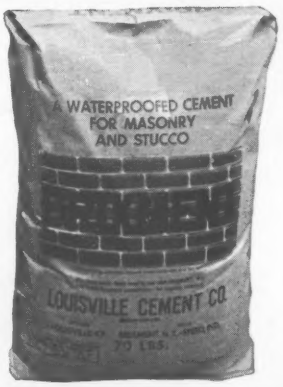
BRIXMENT

Better Mortar for Blocks

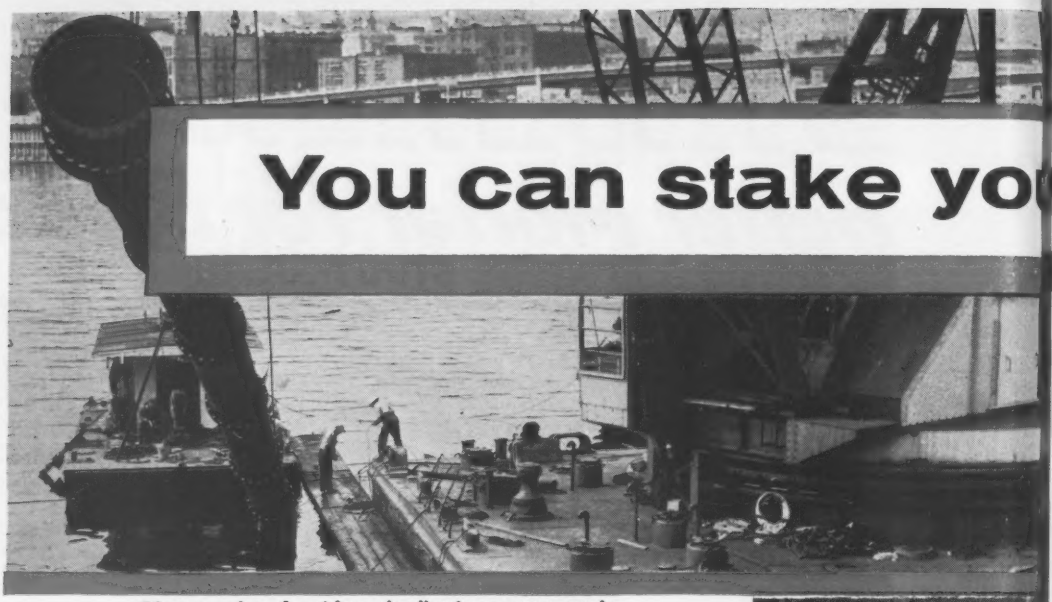
BETTER PLASTICITY

To build the best possible concrete-block walls, the bricklayer must use plastic mortar. The mortar must be plastic enough to stick to the long head joint. It must not drop off the edges of the block when the block is swung up, and lowered into place. It must remain plastic long enough to enable the bricklayer to tap the block down to the line, easily and accurately.

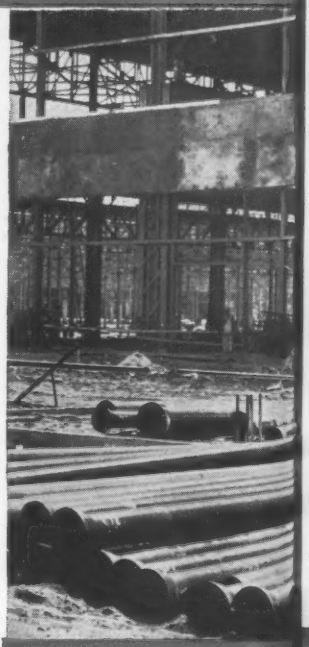
Brixment mortar provides this necessary plasticity. Moreover, it stays soft and plastic long enough to let the bricklayer level, plumb and straighten the unit and adjust it to its final position in the wall before the mortar stiffens.



Louisville Cement Company . . . Louisville 2, Kentucky



River crossing of cast iron pipe line to carry sewage to disposal plant at Portland, Oregon.



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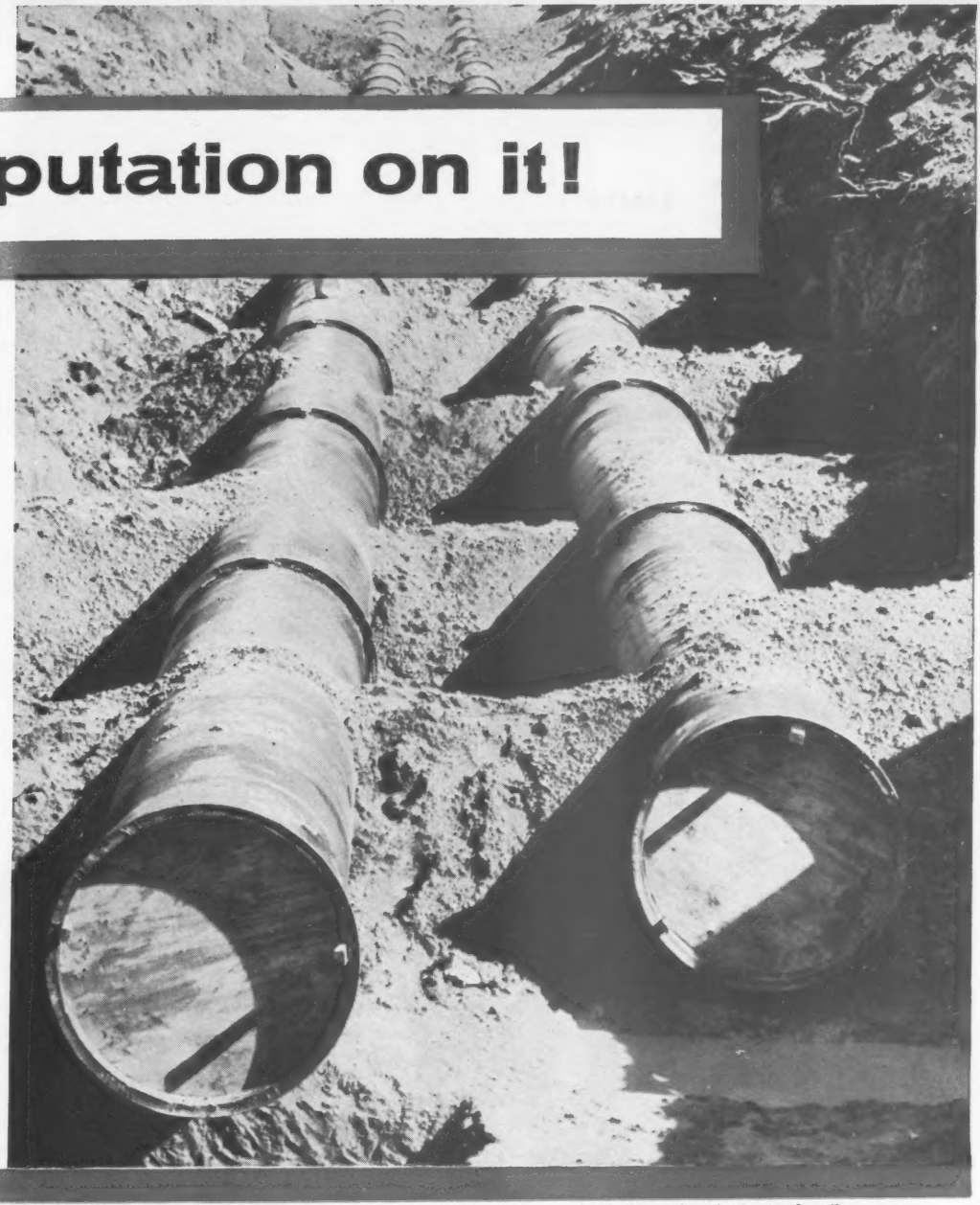

Installing large diameter cast iron pipe lines supplying water to synthetic fibre plant in South Carolina.

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SERVES FOR CENTURIES...

(Continued from page 138)

▲ **CALIFORNIA**—State Dpt. P. Wks., 1120 N St., Sacramento.

Griffith Co., 1060 S. Broadway, Los Angeles 15, Calif., CA **$4,199,746**; constr. 2 mi. Ventura Freeway between 0.3 mi. south of Moorpark St. and 0.3 mi. west of Laurel Canyon Blvd., in Los Angeles, Los Angeles Co. Bids July 18, awarded July 31, CD 7/24, under LB.

Casner Constr. Co., Temple City, Calif., CA **$249,000.** Animal Shelter No. 4, Baldwin Park, Proj. 7714, LOS ANGELES, CALIF. Los Angeles Co. Hall of Records, 501 Hall of Records, Los Angeles, Calif. Bids June 26. CD 6/4.

Wm. McIntosh & Son, 635 Texas St., San Francisco, Calif., LB **$138,698**, (5 bidders) rehabilitate Jackson Playground and field house, SAN FRANCISCO, CALIF. City and San Francisco Co., Recreation & Park Comm., McLaren Lodge, Fell and Stanyon Sts., San Francisco, Calif., CD 11/11/55.

▲† **The Hawaiian Dredging & Constr. Co., Ltd., J. H. Pomeroy & Co., Inc., and Koster & Wyth, P. O.** Box 3468, Honolulu, T. H., CA **$1,634,000**, hangars Naval Air Station, NBy 3344, MARIANAS ISLANDS, GUAM. Bureau Yards & Docks, c/o Res. Officer in Charge of Constr., 333 Fell St., San Francisco, Calif. Bids June 7, awarded July 24. CD 6/14, under LB.

BUILDINGS—LB & CA

▲ **Gale S. Roberts**, 338 W. 11 Ave., Eugene, Ore., CA **$1,181,565.** COURT HOUSE, EUGENE, ORE. Lane Co., Court House, Eugene, Ore. Bids July 11, awarded July 27. CD 7/18, under LB.

Bechtel Brothers, La Grande, Ore., LB **$365,400** (8 bidders) PHYSICAL EDUCATION BLDG., Eastern Oregon College of Education, LA GRANDE, ORE. Bd. Higher Educ., University of Oregon, Eugene, Ore. Bids July 25, CD 7/3;
Waldo S. Hardie & Son, Eugene, Ore., LB **$399,854** (8 bidders) dormitory, Eastern Oregon College of Education (La Grande, Ore.).

Portland Osteopathic Hospital, 616 N.W. 18 Ave., Portland, Ore., rejected bids June 12, HOSPITAL, PORTLAND, ORE. LB Est. **$864,970.** Will re-advertise. CD 6/21, under LB.

Crown Constr. Co., 5059 W. Pico Blvd., Los Angeles, Calif., CA **$562,373**, SUNNYDALE SCHOOL and ADMINISTRATION UNIT, LANCASTER, CALIF. Lancaster School Dist., 44721 N. Date Ave., Lancaster, Calif. Bids May 28. CD 6/26, under LB.

Harrod & Williams Enterprises, 290 S. Murphy St., Sunnyvale, Calif., LB **$857,775** (7 bidders) frame, masonry, CHURCH, 2 church SCHOOL BLDGS., SANCTUARY, CHAPEL, SOCIAL UNIT BLDG., SANTA CRUZ, CALIF. First Congregation Church of Santa Cruz, Center and Lincoln Sts., Santa Cruz, Calif. Bids July 25. CD 7/10.

Herbert Goldsworth, 409 Santa Monica Blvd., Santa Monica, Calif., CA **$607,270**, 2 story, frame brick 18,000 sq. ft. and 20,000 sq. ft. prefab steel concrete slab EDUCATIONAL FACILITIES BLDG. and MAINTENANCE SHOPS, TORRANCE, CALIF. Torrance Unified School Dist., 2335 Plaza del Amo, Torrance, Calif. CD 5/13, under LB.

Louis C. Nelson & Sons, 2015 N. McCall St., Selma, Calif., CA **$468,180** (7 bidders) 1 story, steel frame Alice Mulcahy SCHOOL, TULARE, CALIF. Tulare City School Dist., c/o Supt., Tulare, Calif. Bids opened July 25. CD 7/12.

CANADA

HEAVY CONSTRUCTION—BA

Que., Lachine—MATERIALS, etc.—BA 8/27—St. Lawrence Seaway Authority, **No. 2**, Temporary Bldg., Ottawa, Ont. supply of materials and constr. bldgs. on Lachine and Soulange sections of Seaway. A. G. Murphy, c/o owner, 685 Cathcart St., Montreal, ch. engr.

Que., Montreal—PUBLIC BATHS—BA 8/28—City, City Hall, restoration of public baths, Hushion, LaPointe-Letourneau and Rubenstein, incl. replacing existing plumbing and electrical installations, etc. $500,000. Plans deposit $100. Paul G. Brassard, 3711 Dupuis Ave., and Shorey, Ritchie & Douglas, 4147 Sherbrooke St. W., archts. CD 12/9/55.

Ont., Ottawa—RECREATION CENTER—BA 8/30—Ottawa Civil Service Recreation Assoc., 304 Laurier Ave. W., recreation center, Riverside Dr., incl. gym., theater, music and hobby rooms, etc. $700,000. Plans deposit $100. Hazelgrove, Lithwick & Lambert, 575 Laurier Ave. W., archts. CD 5/24/55.

BUILDINGS—BA

Ont., Ottawa—CHEMISTRY, etc.—BA 8/21—University of Ottawa, Laurier Ave., 4 story, rein.-con., limestone chemistry bldg., auditorium and administration bldg. Over $350,000. Jean Serge Le Fort, 86 Greenfield Ave., archt. CD 4/5/56.

Ont., Haileybury—CONVENT—BA 8/22—Soeurs de L'Assomption Mother House, 20 rue St. Jean Baptiste, Nicolet, 6 story, 50x150 ft., structural steel, brick convent, $500,000. Jean Louis Caron, 302 Bonaventure St., Three Rivers, archt. CD 7/26.

Ont., Toronto — SCHOOL — BA 8/22 — North York Bd. Educ., 7 Kenneth St., Willowdale, Junior High School, Gorman Rd. Approx. $600,000. Gordon S. Adamson & Assoc., 52 St. Clair Ave. E., archts. Nicholas Fodor & Assocs. Ltd., 92 Yorkville Ave., engrs. CD 6/24.

Que., Clermont—MILL—Bids Asked—Donohue Bros., Ltd., 51 Desjardins St., Quebec City, 1 story, 360x74 ft., steel frame, brick walls, sulphite mill addn. $150,000. Stadler Hurter & Co., 150 St. Catherine St. W., Montreal, engrs. CD 1/24.

HEAVY CONSTRUCTION—LB & CA

Diamond Constr. Co., 480 Union St., Fredericton, N. B., LB **$534,906** (7 bidders) addnl. airport development comprising the lengthening and widening Runway 04-25 to 6,000 ft. x 200 ft., recapping of Runway 02-20 and installation of drainage, MONCTON, N. B. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids July 25. CD 7/12.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto, bids opened 7/24,

Curran & Briggs Ltd., 61 Haverson Blvd., Toronto, Ont., LB **$181,824** (7 bidders) Contr. 57-143, hot mix paving 13.3 mi. Sec. Rd. No. 612 from 12.7 mi. north of Hy. 17 to Quirke Lake. CD 7/19.

Ontario Marine & Dredging Ltd., 67 Yonge St., Toronto, Ont., LB **$232,000** (11 bidders) dredging, GODERICH, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids July 24. CD 7/12.

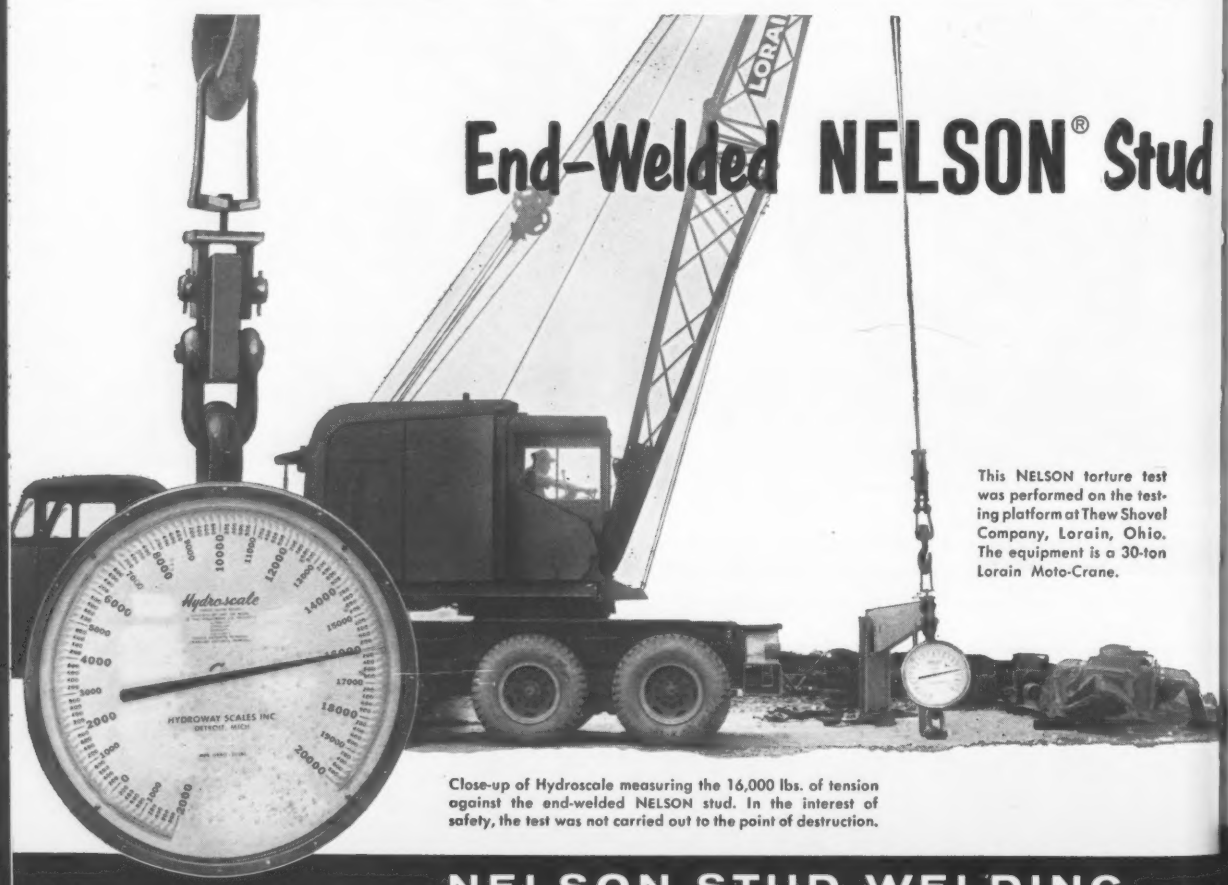
Canadian Dredge & Dock Co. Ltd., Harbour Commissioners Bldg., Toronto, Ont., CA **$649,521.** harbor imprvs., LEAMINGTON, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Awarded July 29. CD 3/6, under LB.

J. P. Morin Ltee., 93 Bryere St., Ottawa, Ont., LB **$534,447** (12 bidders) laboratory wing to high speed laboratory, Defence Research Board, Uplands A.F.B., OTTAWA, ONT. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Dobush & Stewart, 6435 Sherbrooke St. W., Montreal, Que., archts.

Grant Contg. Co., 26 Queen St. E., Toronto, Ont., LB **$266,984**, Stage 1, sewerage scheme, Lakeview area incl. sanitary trunk sewers, 12,000 lin. ft., 21- to 33-in. concrete pipe and 4,120 lin. ft. 6 in. v.t. pipe for private drain, TORONTO, ONT. Ontario Water Resource Comn., East Block, Parliament Bldgs., Toronto, Ont. Bids July 16. CD 7/1.

Rayner-Atlas Ltd., 46 Eglinton Ave. E., Toronto, Ont., LB **$497,277**, (9 bidders) constr. 36 in. water main in York Mills Rd. from Victoria Park Ave. to Leslie St., TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids July 22. CD 7/15.

Canamount Constr., 6931 Cote des Neiges Rd., Montreal, Que., CA **$781,800**, (4 bidders) supplying, erecting plain and rein.-con. at first floor and prestressed concrete slabs, light weight concrete slabs steel cellular flooring Air Terminal Bldg., MONTREAL, QUE. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids May 21, awarded July 23, CD 5/31, under LB.



End-Welded NELSON® Stud

This NELSON torture test was performed on the testing platform at Thew Shovel Company, Lorain, Ohio. The equipment is a 30-ton Lorain Moto-Crane.

Close-up of Hydroscale measuring the 16,000 lbs. of tension against the end-welded NELSON stud. In the interest of safety, the test was not carried out to the point of destruction.

NELSON STUD WELDING . . .

Cite Constr. Co. Ltee., 275 St. Zotique St. W., Montreal, Que., CA **$599,040** (6 bidders) exhibition conservatories, Botanical Gardens, 4101 Sherbrooke St. E., MONTREAL, QUE. City, City Hall, Montreal, Que. Bids July 10, awarded July 26. CD 7/18, under LB.

Edouard Monette Ltee., 2190 Gouin Blvd. E., Montreal, Que., CA **$72,912**, supply and install c.i. main, proposed street north of Angrignon Park, from Blvd. de la Verendrye to Irwin St., MONTREAL, QUE. City, City Hall, Montreal, Que. Bids June 19, awarded July 25. CD 9/13/44.

G. M. Gest Ltd., 128 Elmslie St., Montreal, Que., LB **$278,606**, underground conduits on north and south sides of Metropolitan Blvd. from west to east limits of city of St. Michel, MONTREAL, QUE. Montreal Metropolitan Comn., 506 St. Catherine St. E., Montreal, Que. Bids July 31. CD 8/17/51.

Ain & Zakuta Ltd., 6910 Wiseman Ave., Montreal, Que., LB **$215,696**, (11 bidders) constr. standard apartment bldgs. A, B, & C. complete with services at Royal Canadian Air Force Station, ST. HUBERT, QUE. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids July 23. CD 7/12.

BUILDINGS—LB & CA

James Kemp Constr. Ltd., P. O. Box 52, Station "B" Hamilton, Ont., LB **$370,060** (13 bidders) FEDERAL BLDG., COBOURG, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Barneett & Rieder, 96 Eglinton Ave. E., Toronto, Ont., archts. Bids July 24. CD 6/21.

Evan S. Martin Constr. Ltd., 641 Caledonia Rd., Toronto, Ont., CA Est. **$300,000** (8 bidders) 1 story, 30,000 sq. ft. steel frame PLANT, OAKVILLE, ONT. Canadian General Electric Co., Ltd., Head Office, 212 King St. W., Toronto, Ont. Bids July 6, awarded July 29. CD 7/2.

Humphreys & Glasgow (Canada) Ltd., 837 Eglinton Ave. W., Toronto, Ont., CA **$650,000** (5 bidders) PROCESS PLANT No. 47 addns., SARNIA, ONT. Dow Chemical Co. of Canada, Ltd., Vidal St. S., Sarnia, Ont. Awarded July 29. CD 4/18/52.

Jannison & Scott Ltd., 35 Cedar St., Sault Ste. Marie, Ont., CA **$371,000**, est. $350,000 (5 bidders) 3 story masonry NURSES TRAINING SCHOOL and RESIDENCE and 1 story LECTURE ROOM, SAULT STE. MARIE, ONT. Bd. Directors Plummer Memorial Hospital, Sault Ste. Marie, Ont. Bids June 14, awarded July 25. CD 6/3.

Dalton Eng. & Constr. Co., Ltd., 1140 Castlefield Ave., Toronto, Ont., CA Est. **$150,000** (5 bidders) 104x214 ft., rein.-con. WAREHOUSE, TORONTO, ONT. W. A. Gilbey (Canada) Ltd., 18th St., New Toronto, Ont. Bids July 15. CD 7/17.

Dell Constr. Co., Ltd., 2461 Bloor St. W., Toronto, Ont., LB **$381,290**, 1 story, bsmnt. POST OFFICE in Don Mills Shopping Center, TORONTO, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. John B. Parkin Assocs., 1500 Don Mills Rd., Toronto, Ont., archts.

George A. Crain & Sons Ltd., 555 Cambridge St., Ottawa, Ont., CA **$998,668.** MILL exten., Eddy St., HULL, QUE. E. B. Eddy Co. Ltd., 2 Eddy St., Hull, Que. CD 3/18.

Ain & Zakuta Ltd., 6910 Wiseman Ave., Montreal, Que., CA Est. **$150,000** (7 bidders) 2 story, 94x130 ft., rein.-con., brick, block WAREHOUSE and OFFICE, Pare St., MONTREAL, QUE. Evans Realty Co., c/o David Reich, 5810 Cote St., Luc Rd., Montreal, Que., archt. Bids July 19, awarded July 26. CD 7/18.

Georges Goyette, 10880 Esplanade Ave., Montreal, Que., CA Est. **$800,000.** 50-unit HOUSING program, 15 Ave. and 10 St., MONTREAL, QUE. Roxboro Enterprises Regd., c/o Antonio Polemeno, 2356 Belanger St. E., Roxboro, Montreal, Que. Elio Vincelli, 429 Jean Talon St. W., Montreal, Que., archt. Awarded July 29.

Montclair Constr. Co., Ltd., 5515 Upper Lachine Rd., Montreal, Que., CA Est. **$500,000**, 1 story, 100,000 sq. ft., steel structure, PLANT and OFFICE, concrete fdn. St. Michel Blvd., MONTREAL, QUE. Leviton Canada, Ltd. (wiring devices) 8480 Jeanne Mance St., Montreal, Que., awarded July 23.

▲ **Beaucastel Ltee.**, c/o Henri Boissonnault, 208 Bloomfield Ave., Outremont, Montreal, Que., Owner Builds, **$1,000,000.** 14 APARTMENT BLOCKS, Ronald Dr., MONTREAL WEST, QUE.

LATIN AMERICA

BUILDINGS—BA

Argentina, El Chocon—BA 9/25—Agua y Energia Electrica of Buenos Aires, 700,000 kw hydroelectric power plant. Plans deposit $36.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Calif., San Diego**—San Diego Co. Water Auth., Land Title Bldg., constr. San Diego Aqueduct to bring 160 mgd. water from Colorado River. **$35,000,000.** To start this year.

Ind., Kendallville—City, City Hall, water dpt. expansion. **$350,000.**

Mo., Marysville—City, City Hall, bond election Oct. 8, water sys., incl. distr. sys., **$200,000**; filter bldg., **$154,000.** CD 8/1/56.

▲ **Mont., Helena**—City, City Hall, voted bonds July 23, treatment pumping plant and other facilities to bring Missouri River water into city's present water sys. **$1,600,000.** CD 6/19.

N. J., West Caldwell—Boro of West Caldwell, 2 Fairfield Ave., pumping station for proposed new storage tank. **$100,000.** Malcolm Pirnie, 25 W. 43 St., New York, N. Y., consult. engr.

O., Sheffield—Village, Village Hall, $200,000 bond election Nov. 5, municipal water system piping water to village from Elyria, **$591,041.**

Okla., Fort Gibson—City, City Hall, defeated bonds July 23, WW exten. **$100,000.** CD 6/28.

▲ **Tex., San Antonio**—City Water Bd., 106 W. Market St., 144 mi. water lines throughout city **$10,957,000**; Canyon Dam Reservoir **$1,500,000**; misc. imprvs. and extensions to WW sys. **$2,530,000**; Olmos Basin Water pumping plant **$2,449,000**; modernization of existing artesian pumping station **$788,800**; modernization of existing Mission Pumping Station **$686,500**; Pressure Regulating Water Tank No. 2 **$175,000.** Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 6/28/56.

Tex., San Antonio—City Water Bd., 106 W. Market St., laying 16 in. water main from 34th St. Pumping Station to Market St. Station. **$800,000.**

▲ **Alaska, Juneau**—City, City Hall, rehabilitating water sys. **$1,250,000.** Cornell, Howland, Hayes & Merryfield, Corvallis, Ore., consult. engrs. CD 5/1/56.

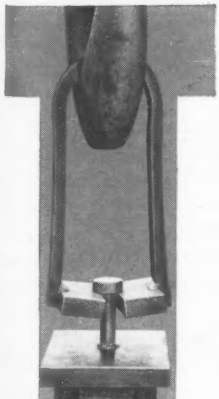
SEWERS, WASTE DISPOSAL

Ariz., Avondale—Town, Town Hall, sewerage sys. **$325,000.**

Ariz., Casa Grande—City, City Hall, 5th and Marshall Sts., sewerage sys. with trunk line and treatment plant, **$357,000.** Johannessen & Girand, 1st National Bank Bldg., Central at Washington, Phoenix, consult. engrs. CD 7/17.

▲ **Ark., Little Rock**—Little Rock Sewer Comn., John M. Lofton, Jr., chn., City Hall, constr. of and equipment, auxiliaries and appurtenances, etc. for sewage treatment plant on 55⅓ acre site northeast of Adams Field between Arkansas River levee and Fourche Dam Pike, **$2,266,000.** Burns & McDonnell Eng. Co., 95th and Troost Sts., and P. O. Box 7088, Kansas City, Mo., consult. engrs. Bids in late September or October. CD 3/26/56.

Resists 8-Ton Load!



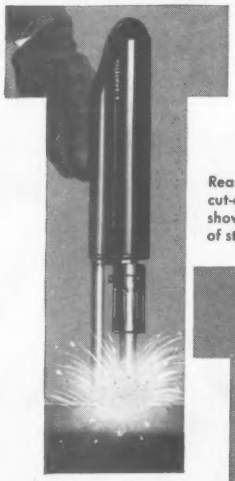
Close-up of stirrup used to complete the linkage between test stud and the crane cable hook. Photo was taken while stud was under full 16,000-lb. load. Bent stirrup indicates force of this grueling test.

• Nelson Engineers tested a ⅝" diameter standard headed stud to determine the strength of the weld.

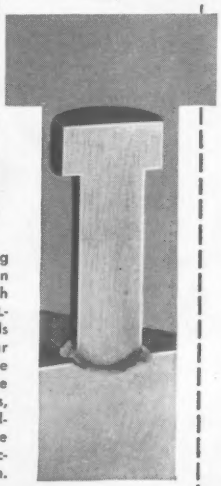
These photographs attest to the amazing tensile strength of a NELSON end-welded stud. Torsion and shear strength are equally amazing.

Holding power like this suggests that it pays to stop before drilling a hole and consider the NELWELD® method of fastening...the system that also saves time, eliminates flanges and bosses and makes "hole engineering" unnecessary.

The manual offered in the coupon goes into detail on design and applications, and recommended torque and tensile loadings of studs for normal applications.



Reason for strength... cut-a-way view of stud shows complete fusion of stud and base plate.



The headed stud being used in this test is shown being stud welded with the portable NS-9 NELWELD Gun. These studs are often used as shear connectors on concrete and steel composite bridges. Threaded studs, and a multitude of standard types and sizes are available for manufacturing and construction.

NELSON STUD WELDING CONSTRUCTION MANUAL

Fasten It Better at Less Cost with

NELWELD

Division of Gregory Industries, Inc., Lorain, Ohio

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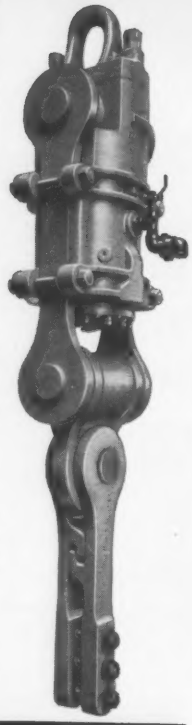

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ECONOMY- efficient, balanced design, sturdy construction assures enduring economical performance.

EASY OPERATION- simple in design, it is easy to operate—pulls sheet steel, wood, concrete, H-beam and pipe piles with the greatest of ease.

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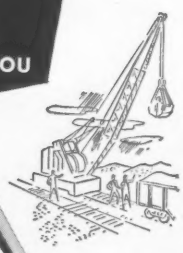
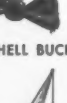


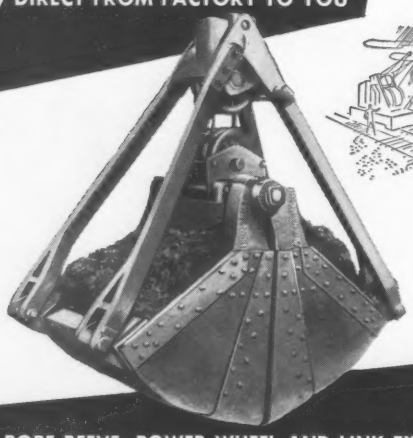
CLAMSHELL BUCKET



LOCOMOTIVE CRANE

COAL-ORE BRIDGE

ORE UNLOADER



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ROPE REEVE, POWER WHEEL AND LINK TYPE

WRITE FOR ILLUSTRATED CATALOGUE

INDUSTRIAL BROWNHOIST CORPORATION

BAY CITY, MICHIGAN

Calif., Agnews—State Div. Architecture, 1120 N St., Sacramento, install storm and sanitary sewer lines, Agnews State Hospital, for Dpt. Mental Hygiene, $141,200. CD 10/26/54, under Public Bldgs.

Calif., Fields Landing—Fields Landing Community Services Dist., sewer extension and hookup to Eureka sewerage sys. $125,000.

▲ **Calif., Livermore**—City, City Hall, sewage tr. plant and appurtenances at Hageman Site. $1,448,700. Brown & Caldwell, 66 Mint St., San Francisco, consult. engrs. CD 10/10/55.

Colo., Pagosa Springs—City, City Hall, sewage collection and disposal system, $220,000.

Conn., Bridgeport—City, City Hall, sewerage pumping station, River St. to replace existing station, $150,000.

Del., Rehoboth Beach—City, City Hall, sewage disposal plant expansion, $250,000. Constr. late in 1957. Albright & Friel, Inc., Penn Center Plaza, Phila., Pa., consult. engr.

Kan., Topeka—City, City Hall, interceptor sewer, $500,000; Sanitary Sewer No. 208, $74,000. Abram Pratt, city engr.

Mass., Longmeadow—Town, Bd. Water & Sewer Comrs., 20 Williams St., plans by Bowe, Albertson & Assoc., archts.-engrs., 75 West St., New York, N. Y., first phase, North-End Interceptor Sewer, $90,000. Bids in August; second phase, South End Interceptor Sewer and primary sewage treatment plant, $100,000. Constr. late in 1957. CD 4/12/44.

▲ **Mich., Lincoln Park**—City, William Suzora, clk., storm sewers and drains to relieve flooding of bsmnts. $2,000,000. Pate & Hirn, 532 Michigan Bldg., Detroit, Mich., consult. engrs.

Minn., Farmington—Village, F. Johnson, clk., postponed $295,000 bond election set for July 15, sewage disposal plant. No new date has been set. CD 6/28.

▲ **Mo., Raytown**—City, City Hall, two trunk line sewers. $1,095,000; lateral sewers, $1,727,000. B. L. Oliver & Co., 1805 Grand Ave., Kansas City, Mo., consult. engrs. CD 7/10.

▲ **Mo., Springfield**—City, Bart Avery, mgr., City Hall, sewage treatment plant in Southwestern section of city. $4,250,000. Consoer, Townsend & Assocs., 360 E. Grand Ave., Chicago 11, Ill., consult. engrs. CD 9/28/55.

O., Bradford—Village, Village Hall, sewage disposal plant, $540,000. Bids this year.

▲ **O., Rocky River**—City, City Hall, 21012 Hilliard Rd., bond election Nov. 5, sewage disposal plant and installing sanitary sewers, $1,300,000. Floyd G. Brown & Assocs., Marion, consult. engrs. CD 12/15/55.

▲ **O., Warren**—City, City Hall, bond election Nov. 5, storm relief sewers, $3,500,000. CD 3/16/44.

Okla., Midwest City—City, City Hall, defeated bonds July 23, storm sewers. $750,000. CD 7/11.

Tex., Anahuac—City, H. James, mayor, sanitary sewerage sys. $100,000.

Tex., Farmers Branch—City, City Hall, voted bonds July 13, sanitary sewer lines $245,000; sewage disposal unit $75,000; storm drainage $244,000. CD 5/27.

Tex., Hale Center—Town, Town Hall, sanitary sewers $75,000; open and closed drainage, $75,000.

Tex., Temple—City, c/o W. E. Routh, mgr., 2 m. g. sewer treatment plant. $250,000. Freese & Nichols, 407 Danciger Bldg., Fort Worth, consult. engrs. CD 5/28.

Utah, Salt Lake City—Taylorsville Bennion Imprvt. Dist., Edward W. Clyde, atty., 351 S. State St., sewerage sys. and make future water imprvs. $585,000. Caldwell, Richards & Sorenson, 408 Zion's Savings Bank Bldg., consult. engrs.

BRIDGES

▲ **Calif., Stockton**—City, City Hall, grade separation at El Dorado and Center Sts., $2,321,600. H. C. Holman, 234 W. Harding Way, civil engr. CD 7/22, under Streets and Roads.

Iowa, Oskaloosa—Mahaska Co., bridge over Des Moines River, near here, $530,000.

Wis., Appleton—City, City Hall, Oneida St. bridge, $500,000. Fenner-Brey Eng. Corp., 928 S. 8 St., Manitowoc, consult. engrs.

STREETS AND ROADS

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento,

Calaveras Co.—grading, constr. subbase 3.3 mi. of Murphys Grade Rd. between 3.3 mi. northeast of Altaville and Murphys FAS S-1150 (2) $260,000 Bids probably in May 1958.

Kern Co.—grading, surf. and installing railroad signals on Manor St. between Main Canal Bridge and China Grade Loop at Oildale, length of 1.8 mi. FAS S-SG-887(5) $220,000; Bids probably in October.

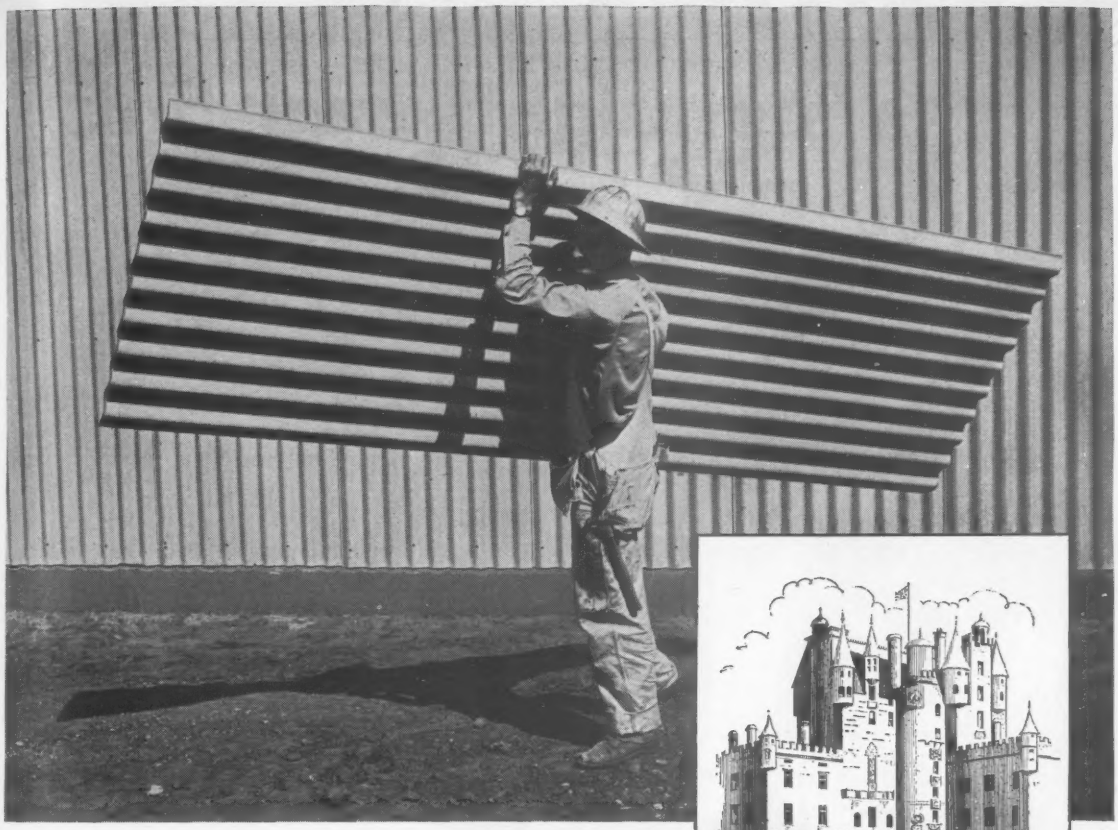
Merced Co.—surf. 5.9 mi. Santa Fe Drive between Stanislaus Co. line, about 4 mi. east of Rulock and El Capitan Way, FAS S-912 (9), $150,000. Bids probably in late August 1957.

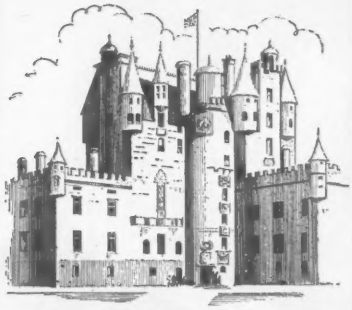
Nevada Co.—grading, constr. drainage on Tyler-Foote Rd. between Kennedy Ranch and 0.7 mi. west of North Columbia, length of 3.1 mi. FAS S-765(2) $160,000. Bids probably in October.

surf. 3.4 mi. Brunswick Rd. between State Rte. 17 near Town Talk about 1.5 mi. northeast of Grass Valley and State Rte. 25 FAS S-1203 (2) $75,000. Bids probably in September.

San Bernardino Co.—grading surf. 3.4 mi. Bryan St. between Yucaipa Blvd. at Yucaipa and State Rte. 190. FAS S-715(2) $400,000. Bids probably in March or April 1958.

(Continued on page 147)





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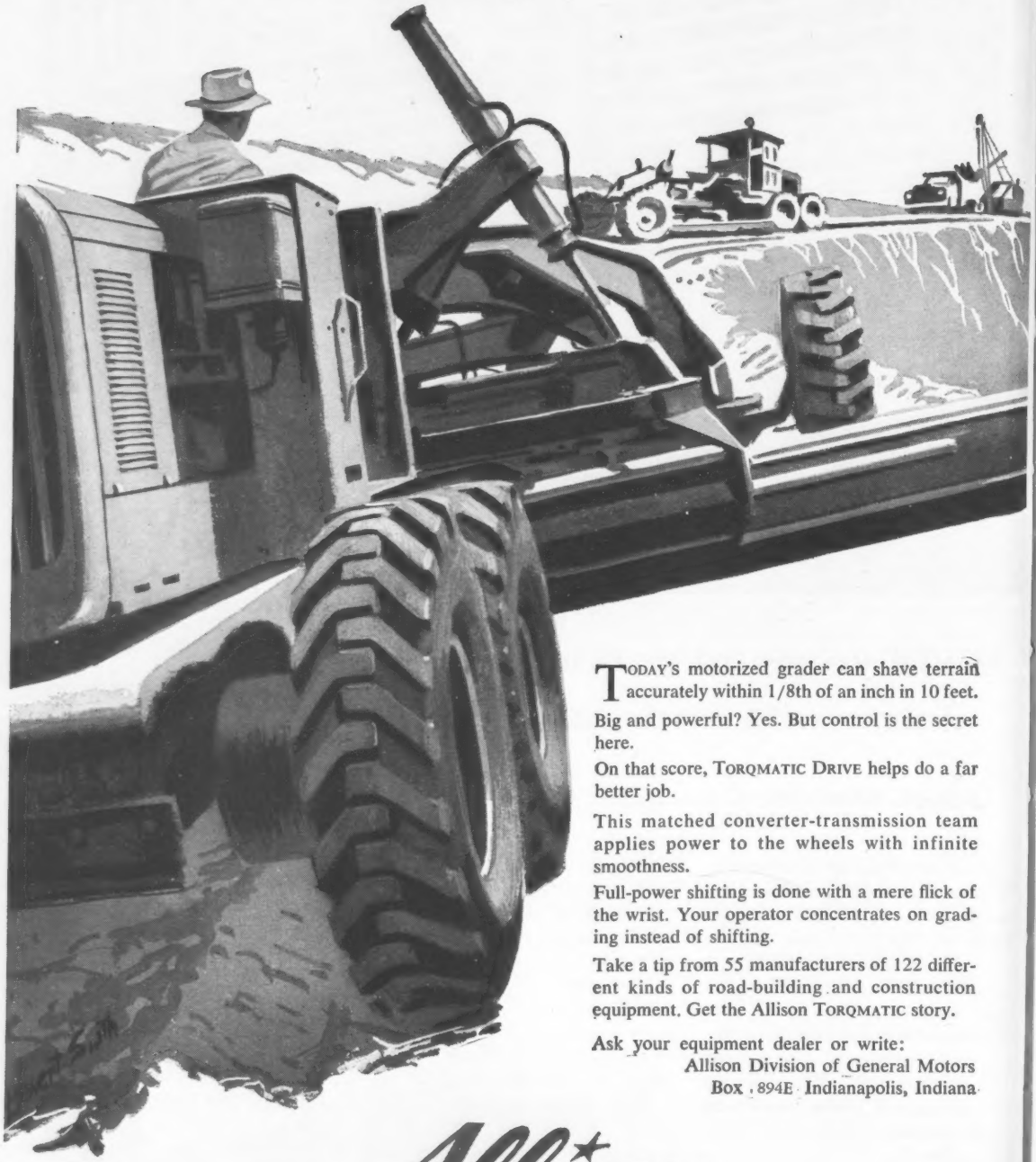

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TORQMATIC DRIVES

(Continued from page 144)

Ventura Co.—grading, surf. portion 2.7 mi. McGrath Blvd. between Pierpont Blvd. and West 5th St. about 3 mi. west of Oxnard, FAS S-1164(2) $334,100; Bids probably in September.

Calif., Yuba City—Sutter Co., c/o Rd. Comnr., Courthouse, road imprvs. and maintenance various locations throughout county. $509,000, Constr. 1958.

▲ Ill., East St. Louis—City, Mayor Alvin G. Fields, City Hall, constr. East St. Louis Expressway along Third Street between St. Louis and Missouri Aves. incl. two overpasses and their approaches. $1,750,000. H. W. Lochner, Inc., 1508 E. 72 St., Chicago, consult. engr.

Kan., Topeka—City, City Hall, Paving Proj. No. 1. $110,000. Abram Pratt, Topeka, Kan. city engr.

Kan., Topeka—City, City Hall, Paving Project No. 3, $173,000; resurf. and seal coating, Proj. 2, $100,000; Paving Proj. No. 5, $137,000. Abram Pratt, city engr.

Mich., Harper Woods—City, Robert J. McNutt, mgr., 19617 Harper St., 22 mi. seal coating and paving various streets. $723,000. Pate & Hirn, 532 Michigan Bldg., Detroit, consult. engr.

▲ RHODE ISLAND—State R. I. & Prov. Plants, Div. Purchase, State House, Providence,
North Smithfield—Louisquisset Pike Extension to Massachusetts line North Smithfield Expressway $6,039,000. C. W. Riva Co., 511 Westminster St., Providence, consult. engr. Bids in spring 1958. CD 2/1.

QUEBEC—Provincial Dpt. Rds., Parliament Bldgs., Quebec City,
St. Paulin—paving, repairs and new roads St. Elie, St. Mathieu, St. Paulin and St. Justin, $270,000.
Ste. Tite—new road, Ste. Tite to St. Roch de Mekinac $190,000.

EARTHWORK, WATERWAYS

Okla., Enid—City, voted bonds, July 23, floodway. $985,000. CD 7/10.

AIRPORTS

Ark., Pine Bluff—AIRPORT TERMINAL—Pine Bluff Aviation Comn., c/o City Hall, airport terminal for Grider Field, $107,000. CD 12/17/47.

N. M., Clovis—AIRPORT—City, City Hall, plans by Hasie & Green, Box 1139, Lubbock, Tex., municipal airport., incl. runways, taxiways and buildings. $700,000. CD 1/8/45.

▲ O., Akron—AIRPORT TERMINAL—Comrs. Summit Co., Courthouse, plans by Konarski, Chambers & Stafford, 844 W. Market St., 6 story tower, terminal bldg., Akron-Canton Airport, incl. sewage and water supply sys. roads and service areas, lighting and parking, 16 mi. south of city, $2,836,600. Bids in fall. CD 1/16/56.

PUBLIC BUILDINGS

▲ Calif., Covina—SCHOOLS—Covina Union High School Dist., 165 W. Dexter St., plans by Kistner, Wright & Wright, 1125 W. 6th St., Los Angeles, 2½ classrooms bldgs., administration bldg., etc., Charter Oak High School, $900,000, Bids in about 8 weeks; frame, stucco, rein.-con. Orange Merced High School, $1,250,000; frame, stucco, rein.-con. Azusa-Cypress High School, $1,250,000.

Calif., Folsom—WAREHOUSE—State Div. Architecture, 1120 N. St., Sacramento, industrial warehouse, Folsom State Prison, for Dpt. Correction, $266,960. CD 2/8/45.

▲ Calif., Long Beach—PUBLIC SAFETY—City Council, City Hall, plans by Francis J. Heusel, and Killingsworth, Brady & Smith, 730 E. 3rd St., 7 story, structural steel frame, 174, 125 sq. ft. public safety bldg. to house police dpt., city jail, juvenile dpt., central fire station. $3,500,000. CD 12/18.

▲ Calif., Oakland—OFFICE—State Div. Architecture, 1120 N. St., Sacramento, plans by Warnecke & Warnecke, 111 New Montgomery St., San Francisco, constr. new state office bldg. $3,250,000. Bids expected to be called in November. CD 4/27/55.

▲ Calif., Santa Barbara—SCHOOL—Santa Barbara Bd. Educ., Santa Barbara, plans by Chester Carjola, 129 de la Guerra Studios, high school, incl. 15 bldgs., agricultural, auditorium, administration, gymnasium, library, music, arts and English Bldgs., Turnpike Rd. $3,500,000-$4,000,000. CD 2/12.

Calif., Santa Monica—SCHOOL—City Bd. Educ., 1333 6th St., plans by Joseph & Joseph, 1254 Westwood Blvd., West Los Angeles, Lincoln Junior High School addns. $750,000. CD 2/9/55.

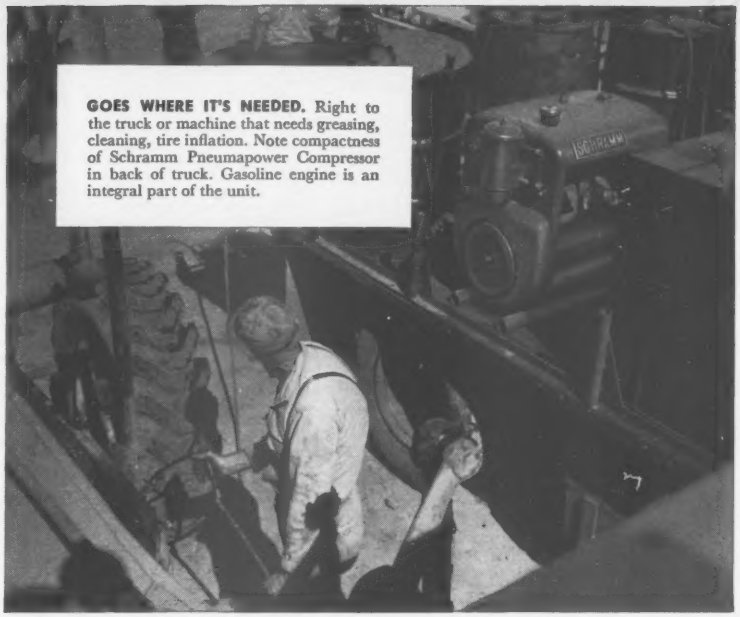
▲ Calif., Santa Rosa—SCHOOL—Santa Rosa City School Dist., c/o Supt., 211 Ridgeway, plans by J. Clarence Felciano, 4010 Montecito, 1 story, wood frame high school bldgs. $2,230,000. CD 3/14/56.

Calif., Soledad—DAIRY—State Div. Architecture, 1120 N. St., Sacramento, dairy addn., Soledad State Prison, for Dpt. Correction. $105,150.

▲ Conn., Enfield—PRISON—Connecticut State Prison, Wethersfield, plans by LaPierre & Litchfield, 292 Madison Ave., New York, N. Y., minimum security prison, Osborne Prison Farm $3,500,000. CD 8/10/54.

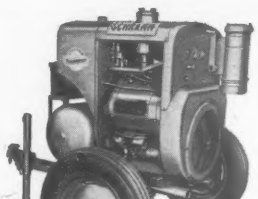
Conn., Greenwich—TOWN HALL—Town, Town Hall, plans by John Gaszo, consult. engr.-archt., c/o owner, town hall addn., incl. two wings. $350,000.

Conn., Middletown—SCHOOL—Town, Town Hall, plans by Seb. J. Passanesi, 164 Court St., Bertrand E Spencer School addn., Westfield St. $400,000. William J. Carson, 99 Mountain Rd., West Hartford, consult. engr. CD 5/20.



GOES WHERE IT'S NEEDED. Right to the truck or machine that needs greasing, cleaning, tire inflation. Note compactness of Schramm Pneumapower Compressor in back of truck. Gasoline engine is an integral part of the unit.

Don't send a man on a boy's errand



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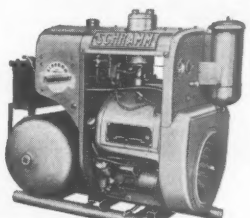

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Conn., New Britain—POLICE STATION—City, City Hall, plans by Rossetti & Di Corcia, consult. engr.-archt., 728 N. Main St., West Hartford, police station $750,000.

Conn., Rocky Hill—SCHOOL—Town, Town Hall, plans by Nichols & Butterfield, 998 Farmington Ave., West Hartford, high school addn. $500,000. CD 7/19.

▲ **Conn., Wethersfield**—LIBRARY, etc.—Town, Town Hall, plans by Ebbets, Frid & Prentice, 862 Asylum Ave., Hartford, 3 story, 72x120 ft., masonry library and 56x156 ft. Town hall, Silas Dean Hy. $1,350,000. Jerome T. Mueller, 15 Lewis St., Wethersfield, consult. engr. CD 6/13.

▲ **Ill., Chicago**—SCHOOLS—Bd. Educ., 228 N. LaSalle St., plans by Bartolomeo Assocs., 10836 S. Western Ave., 2 story, Mount Greenwood Elementary School addn., 112th and Spaulding Ave. $600,000; plans by Childs & Smith, 20 N. Wacker Dr., 2 story, brick elementary school, south side of 70th St. between Dorchester and Dante Ave. $500,000. CD 6/11.

▲ **Ill., Chicago**—SCHOOL—Bd. Educ., 228 N. LaSalle St., plans by Pace Assocs., 53 W. Jackson Blvd., 2 story, brick Thomas Chalmers school addn., East side of S. California Ave. between Roosevelt and 12th Place, $1,000,000; plans by Fugard, Burt, Wilkinson & Orth, 520 N. Michigan Ave., 2 story, brick Medill Elementary School, 1326 W. 14th Place, $1,000,000; plans by Barry & Kay, 53 W. Jackson Blvd., 2 story, brick Schiller Elementary School, Scott and Orchard Sts., $1,250,000; plans by Perkins & Will, 309 W. Jackson Blvd., 2 story North Side Chicago Teachers College, Bryn Mawr and St. Louis Ave., $5,000,000. CD 6/11.

Iowa, Council Bluffs—PARKING—City, City Hall, three level municipal parking bldg., Fourth St. and First Ave. $450,000. Henningson, Durham & Richardson, 2962 Harney St., Omaha, Neb., consult. engrs. CD 2/5.

Kan., Belleville—HOSPITAL—Republic Co., City Hall, Belleville, plans by Anderson, Srack & Johnson, Salina, hospital. $592,170.

Kan., Topeka—SCHOOL—Bd. Educ., City Hall, plans by Glover & Newcomb, 3101 Huntoon St., elementary school. $400,000. CD 4/18/56.

▲ **Md., Baltimore**—SCHOOLS—City, Bureau Bldg. & Constr., 410 Municipal Bldg., Zone 2, plans by Sandlass & Craycroft, 2513 N. Charles St., Zone 18, masonry, Sinclair Lane Junior High School. $950,000; plans by John Carroll Dunn, 717 Washington Place, Zone 1, masonry Belmont Elementary School, Ellamont; Prestman and Rosedale Sts. $900,000; plans by Fletcher & Fletcher, 2117 N. Charles St., Zone 18, masonry, elementary school, Limworth and Craddock Aves., $750,000; plans by Meyer & Ayres, Federal Land Bank Bldg., Zone 18, masonry, Junior High School, Lafayette Ave., $750,000; plans by Charles H. Marshall, 2517 St. Paul St., Zone 18, masonry, Upton School for Trainable Children, 811 W. Lanvale St. $500,000. CD 11/9.

Md., Baltimore—SCHOOL—City, Bureau Bldg. & Constr., 410 Municipal Bldg., Zone 2, plans by Taylor & Fisher, 103 W. Hamilton St., Zone 1, masonry, Harlem Park Elementary School, Gilmor, Mosher and Calhoun Sts. $900,000. R. E. L. Williams, c/o owner bldg., constr. engr. CD 11/9.

Mass., Beverly—SCHOOL—City Supt., Schools, 3 Essex St., plans by John J. Mahoney Assoc., 61 Jefferson Ave., Salem, Trade School addn. Sohier Rd. $500,000. Constr. in 1958.

Mass., Bolton, Stowe or Lancaster—SCHOOL—Nashoba Regional School Dist., Towns of Bolton, Stowe and Lancaster, plans by Architects Collaborative, 63 Brattle St., Boston, Regional High School. $400,000. Constr. 1958.

▲ **Mass., Boston**—GARAGE—City, Mayor's Office, City Hall, public garage for 700-1,000 cars, Blackstone, Clinton John and Fulton Sts., in Faneuil Hall Sections. $1,450,000. Bids in 1958.

Mass., Boston—SCHOOL, etc.—City Dpt. School Bldgs., 26 Norman St., plans by Mario V. Caputo, 6 Beacon St., Boston, Mass., David A. Ellis School addns., alterations, Henry L. Higginson District, $526,000.

▲ **Mich., Berkley**—SCHOOL—Bd. Educ., 2325 Catalpa St., Berkley, bond election Nov. 12, Senior High School, incl. 80 classrooms, library, cafeteria, auditorium, swimming pool, gymnasium and multi-purpose room, Greenfield and Catalpa Sts., $5,000,000. Earl G. Meyer, 806 Farwell Bldg., Detroit 26, Mich., archt. CD 7/24.

▲ **Mich., Dearborn**—EDUCATIONAL CENTER—Regents of University of Michigan, Harold M. Dorr, dean of Statewide Educ., Ann Arbor, plans by Giffels & Vallet, Inc., L. Rossetti, Archts. & Engrs., 1000 Marquette Bldg., Dearborn Educational Center, incl. 4 bldgs., roads and utilties, Fair Lane Estate, $6,500,000. Barr & Linde, Essex Center, Vt., and Hubbell, Roth & Clark, Inc., 954 N. Hunter Blvd., Birmingham, consult. engrs.

Mich., Mt. Pleasant—HOSPITAL—Central Michigan Community Hospital, Bd. Trustees, Mt. Pleasant, plans by Clark Ackley, 1811 East Michigan Ave., Lansing, 3 story hospital addn. $350,000.

Minn., St. Cloud—SCHOOL—Bd. Educ., H. Schoelkopf, clk., plans by F. W. Jackson & Assocs., St. Cloud, 1 story, steel frame elementary school, gym., etc. $425,000.

▲ **Minn., St. Cloud**—DORMITORY, etc.—State College Bd., 41 Sherburne Ave., St. Paul, plans by F. W. Jackson & Assocs., St. Cloud, (1) existing dormitory addn. $600,000. (2) new dormitory, $1,000,000. St. Cloud State College. To go ahead within 2 years.

Minn., Winona—DORMITORY—State College Bd., 41 Sherburne Ave., St. Paul, plans by Flad-Smith & Assocs., Winona, dormitory addn., Winona State College. $3[illegible] 000. Constr. within 2 years.

Mo., Sweet Springs—SCHOOL—Bd. Educ., Sweet Spring[illegible] defeated bonds July 19, for 162 x 522 ft. grade [illegible] high school. $540,000. Kenneth O. von Achen & Asso[illegible] 1200 W. 39th St., archts. CD 7/21.

N. J., North Haledon—SCHOOL—Bd. Educ., H[illegible] Mountain Rd., plans by Coffin & Coffin, 125 E. 46 S[illegible] New York, N. Y., elementary school. $790,000. S[illegible] not definitely determined.

† **N. M., Las Cruces**—HOUSING—Consrtuction Offic[illegible] 8th Naval District, Bldg. 16, Naval Station, New O[illegible] leans, La., 51-unit Capehart Housing at Naval O[illegible] nance Missile Test Facility, White Sands Proving Grounds, $500,000.

O., Canton—SCHOOL—Plain Twp. Bd. Educ., 39[illegible] Fraze Ave. N.W., plans by Lawrence, Dykes & Assoc[illegible] 125 Valleyview Ave. N.W., Junior High Scho[illegible] $977,000. CD 11/13.

▲ **O., Cleveland Heights**—SCHOOL—Lutheran Bd. Edu[illegible] 2648 Prospect Ave., Cleveland, Zone 15, plans [illegible] Ward & Conrad, Hanna Bldg., Cleveland, Zone 1[illegible] 500-pupil high school, Mayfield and Yellowstone Rd[illegible] $1,500,000. Bids soon. CD 8/30.

O., Copley—SCHOOL—Copley Bd. Educ., Copley, In[illegible] election Nov. 5, elementary school. $600,000. C[illegible] 11/9/54.

O., Delaware—SCHOOL—Bd. Educ., Union School Dis[illegible] c/o Don E. Hiett, supt., Rte. 4, $820,000 bond el[illegible] tion Nov. 5, Junior High School adjoining Olentan[illegible] High School; repairs to grade schools, $820,000.

O., Eaton—SCHOOL—Bd. Educ., Exempted Village Scho[illegible] Dist., Eaton, bond election Nov. 5, grade scho[illegible] $700,000.

O., Shiloh—SCHOOL—Bd. Educ., Iroquois Local Scho[illegible] Dist., Shiloh, bond election Nov. 5, high school a[illegible] grade school repairs. $980,000.

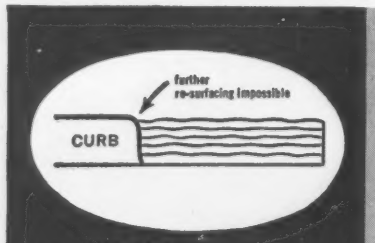
O., Toledo—FIRE STATION—City, Russell W. Rin[illegible] mgr., fire station, Sylvania Ave. and Douglas R[illegible] $190,000. John Davis, city engr.

Pa., Abington—SCHOOL—Abington Twp. School Dist[illegible] Abington, plans by Wigmore & Gilfillen, 117 S. 17 St[illegible] Phila., elementary school or Junior High School, Hun[illegible] ing Pike and Meeting House Rd., $750,000. CD 5/2[illegible]

Pa., Folsom—SCHOOL—Ridley Twp. School Dist., Folsom[illegible] plans by Wigmore & Gilfillan, 117 S. 17 St., Phila[illegible] Senior High School addn. $344,000. Eggley Furlo[illegible] Mall Bldg., 4 and Chestnut Sts., Phila., engrs. C[illegible] 3/8/56.

Pa., King of Prussia—SCHOOLS—Upper Merion Tw[illegible] School Dist., King of Prussia, plans by Joseph Wigmor[illegible] 117 S. 17 St., Phila., 2 elementary schools, Croton Ro[illegible] School and Belmont Elementary School $750,000. C[illegible] 2/4/54, under Pa., Bridgeport.

(Continued on page 157)



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DISAPPEARING GUTTER LINE

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Planes off thick, heavy bituminous concrete like so much shaving soap . . . and leaves the road surface so smooth you can lay the wearing surface directly on it.

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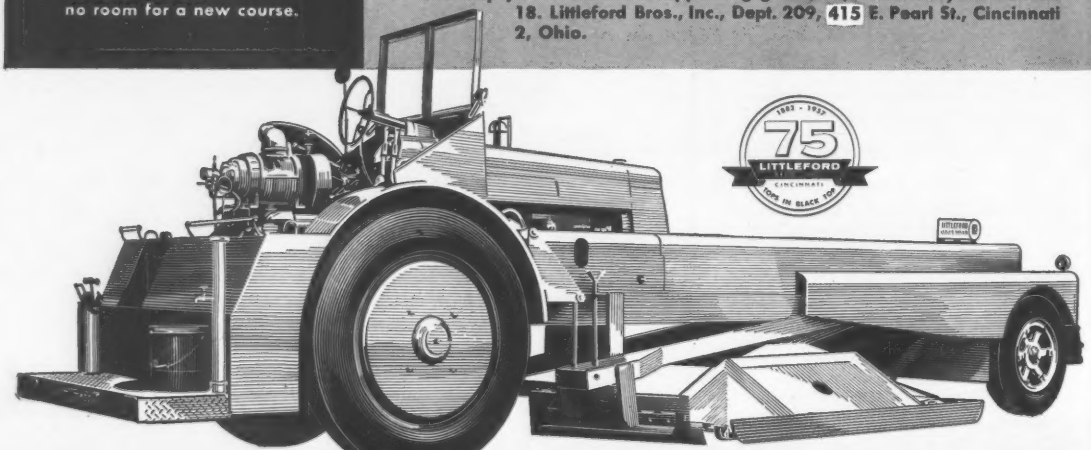
For complete information on how the Littleford-Clarkmoore Heater-Planer can help you avoid the disappearing gutterline, write today for bulletin 18. Littleford Bros., Inc., Dept. 209, 415 E. Pearl St., Cincinnati 2, Ohio.



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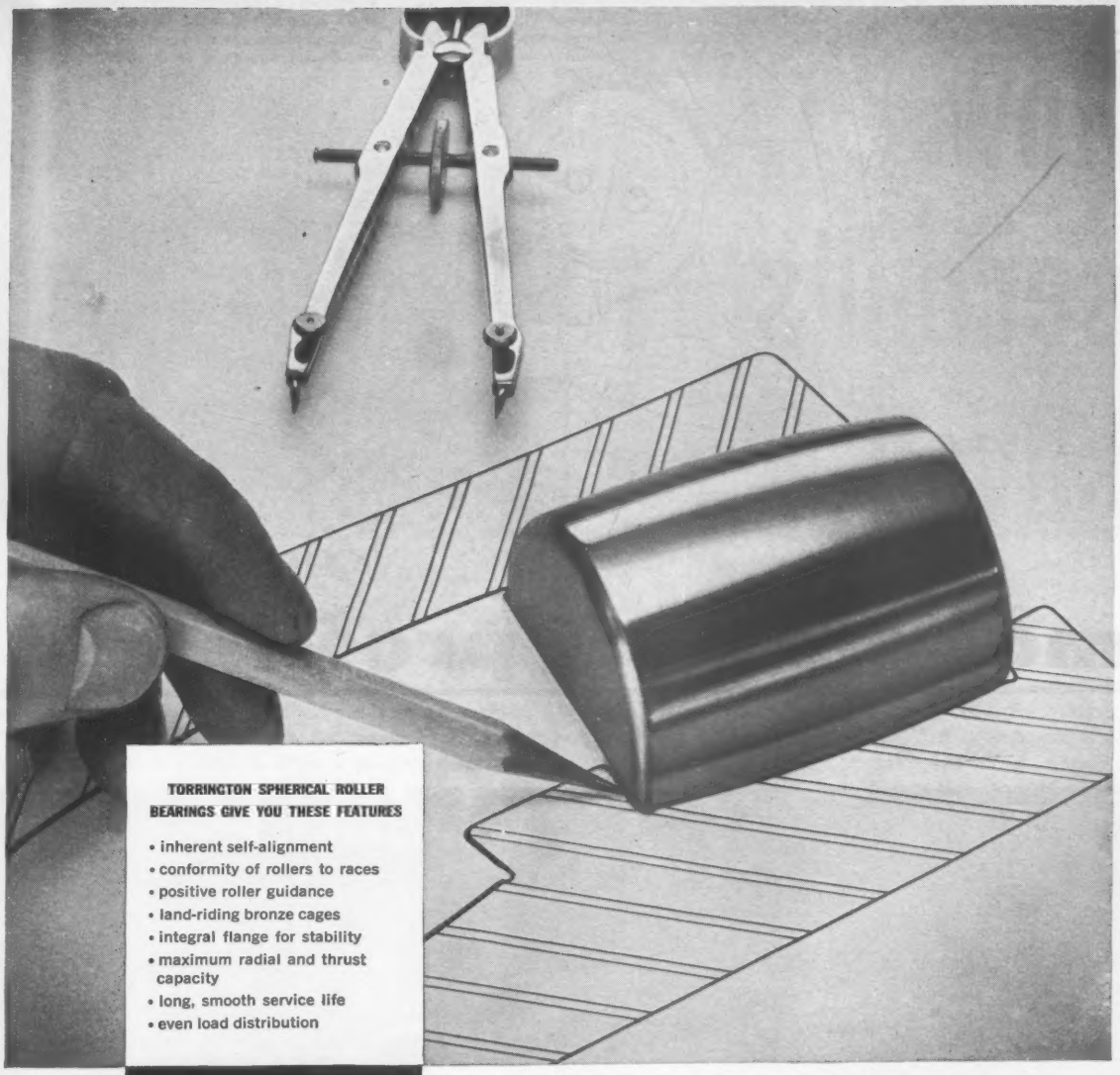

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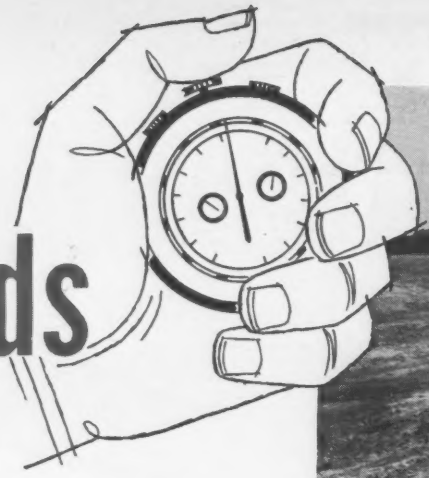
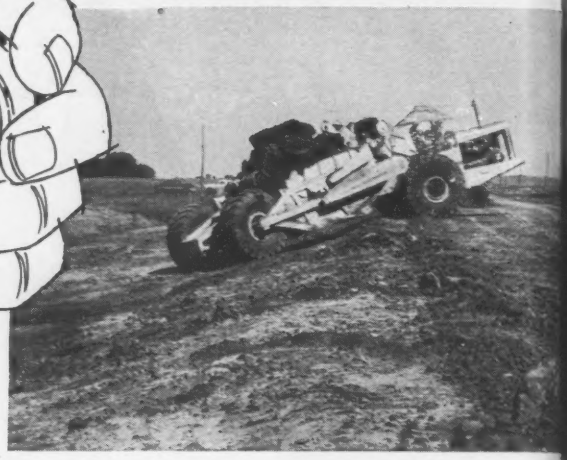
How seconds saved



Archie Campb..., inc., New Rockford, N.D., used 4 : Fullpaks to move 700,000 yds. on improvement of 22 miles of N.D. Hwy. 30, south of Maddock. According to contractor's records, 60,000 pay yards of dirt were moved per 66-hr. week.



make extra profits

Sharp 90° turns out of the cut contributed to C Fullpak completing 2100' load-haul-spread-return dirtmoving cycles in average 3 min. 53 sec. while rebuilding U.S. Hwy. 52 for Blankenship Bros., Charlotte, N.C. Comparable competitive scraper averaged 4 min. 35 sec. for the same cycle.

Three C Fullpaks loaded 15 to 17 yds. of topsoil in an average of 58 seconds, for Brown & Lambrecht, Joliet, Ill. — grading for construction of an additional 2 lanes along 7 miles of U.S. 66, 30 miles southwest of Chicago.

Hugh McMath Construction Co., Columbus, Ga., weighed Fullpak loads up to 50,000 lbs. (17.8 pay-yards) in 2800 lb/yd sandy-clay gumbo, on 4.9-mile Tifton (Ga.) by-pass job. Here, "C's" loaded in 75′ in average of 33 seconds, hauled 550′ in 64 seconds, spread 60′ in 19 seconds, and returned 550′ in 60 seconds for a total cycle of 1235′ in 2 minutes and 57 seconds.

The difference between making a fair profit and breaking even (or maybe losing money) on dirtmoving jobs, is often a matter of seconds saved here and there in your scraper's cycle-time. Five or six seconds saved in the cut, a few less seconds spent on the haul road, four or five more saved on the fill, and a few more seconds cut off your return . . . all add up to more round-trips . . . extra pay-yards moved . . . and substantial increase in revenue per machine.

For example, if you've been hauling 12 loads per hour, and can cut *just 20 seconds* off each cycle, you get 40 minutes *extra* production in a 10-hour day . . . up to 120 *extra* pay-yards for each 18-yd. scraper. At 35c a yard, that's $42 *extra* revenue . . . each day . . . on each rig . . . with no extra cost.

One way to do it

Take the new LeTourneau-Westinghouse C Tournapull® with 18-yd. Fullpak* scraper for instance. It saves on every cycle. It gets heaped loads easier, seconds faster . . . has more pep on the pick-up, gets going fast on a high-speed schedule. C Fullpak saves seconds because it maneuvers easily to reduce cycle distance, often works in footing that would stop other scrapers. It saves more seconds because it dumps clean, spreads accurately on-the-run . . . makes round-trips faster because operators feel safer, work at peak efficiency all day long. The payoff on extra speed that saves seconds is extra payloads . . . extra dollars.

Loads fast . . . heaps high

C Fullpak consistently loads fast, in short loading distance. Dirt flows easily into wide, low-bottom bowl. It packs back corners . . . "boils" up and forward, *high and wide*, to heap jumbo payloads. Big, easy-target push-block concentrates pusher's full horsepower and tractive effort on blade, for maximum thrust. Quick-release on bowl-hoist lets your operator "pump" bowl rapidly up and down . . . get big loads, and save seconds in sand and other loose materials.

Scraper wheels, riding inside 9½′ cutting width, hold Fullpak bowl low in the cut. With scraper bottom angled only 2°, dirt slides almost horizontally into bowl . . . most power is used for cutting, little for lifting load against gravity . . . a prime reason why you get big payloads and save time on every cycle.

Extra visibility saves wasted seconds

Fullpak's low yoke lets your operator clearly see cutting-edge, load, and pusher. He doesn't have to guess or rely on "feel". He can watch the pusher . . . apply loading power at exact moment of contact. Unobstructed view lets him control blade depth for fastest loading, lets him hoist bowl and "highball" for the fill the moment he gets a full load. Easy visibility also aids in maneuvering, and positioning the blade for a fast, accurate spread . . . lets your operator "take-off" back to the cut, the moment spreading is done.

How extra speed makes every yard cost less . . . see next page

Copyright 1957 by LETOURNEAU-WESTINGHOUSE CO.

*Trademark

(continued)

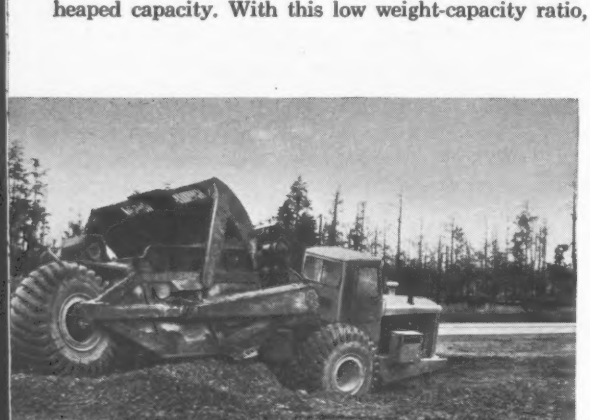
Extra speed saves seconds... earns extra dollars

Rebuilding 3 miles of Manistee County road, Contractor Dan S. Parr, Manistee, Mich., found C Fullpak's short turn-radius a real time saver. Units borrowed sand, and spread on roadway . . . then swung around in tight U-turns on narrow road bordered by swamp and muck.

J. Tomei Construction Co., Van Nuys, Calif., moved 500,000 yards of granite dirt to prepare roads and terraces for homesites in 100-acre mountainside subdivision, near Arcadia, Calif. Three 18-yd. Fullpaks moved average of 5000 yds. daily over steep, difficult terrain.

Faster on the pick-up...

C Fullpak* has more pep . . . more get-up-and-go than other scrapers in the 12 to 18-yd. class. Seconds are saved as it accelerates to top operating speeds faster, because it carries less deadweight . . . less iron on its back than other makes of scrapers in its class. Empty, "C" weighs only 1.21 tons for each yard of heaped capacity. With this low weight-capacity ratio, Tournapull wastes no power . . . cuts seconds from cycle time . . . reduces your cost-per-yard.



Nine Fullpaks helped move 775,000 yds. of dirt in mostly wet weather, on 3.7-mile rebuilding of Rt. 99, thru Ft. Lewis, Washington. Says Supt. Vizarre of Northwest Construction Co., Seattle, "We can work our 'C's' where other rigs would never go. They're terrific loaders, and spread exactly where we need it. Electric controls are foolproof."

18-yd. Tournapull's 29.9 mph easy riding speed saves many seconds on long hauls. In all gears, LeTourneau-Westinghouse Tournapull® has extra power for quick acceleration to pull out of the cut, off the fill, away from stop-and-go conditions faster than other units. What's more, with less iron on its back, 'Pull* can frequently work in next higher gear than others.

Keeps "rolling" thru poor footing

Tournapull also has a traction advantage. It keeps the load moving in sand, mud, or loose materials, where many haulers can't go empty. Big footprint tires grip the ground to pull thru without sinking in. "C" works more days per year — in shut-down weather, earlier in Spring, later in Fall — because power-transfer differential maintains effective pulling-power on drive wheels, regardless of footing.

Whenever one wheel tends to spin on slippery or unstable ground, Tournapull differential *automatically* transfers up to 80% of pull effort to other drive-wheel on firmer footing. This saves valuable momentum . . . maintains power to pull thru, to haul steadily for more cycles per hour, more payloads per day. And with power-transfer differential *plus* geared-kingpin power-steer, you can "walk" unit out of bog-down footing . . . turn prime-mover left, right, left, right . . . pulling scraper ahead with every turn.

faster on haul and return

Speedy, clean dumping

Fullpak spreads evenly on the run . . . unloads *all* material fast, to accurate grade. With apron-lift to 6'1", chunkiest material clears easily thru 9½'-wide opening. Positive-ejection tailgate moves forward, completely cleans out even the stickiest muck from bowl. There is no haul back, no lost pay-yards on the next trip. Precise control and excellent visibility of blade, reduce time on the fill . . . make it easy to get a smooth, even spread, without a second's waste time.

Quick maneuverability

Short, fast turning ability of "C" also helps cut valuable seconds off each end of your dirtmoving cycle — even when there's plenty of turning area. 18-yd. Tournapull makes continuous 180° turns in space only 32'7" wide. Positive, electric-powered, geared-steer with 90° pivot at the kingpin, speeds turns in close quarters . . . reduces length of cycle . . . often eliminates waiting for clearance room or construction of turn-arounds.

Two-wheel prime-mover, rolling on big, job-rated, low-pressure tires, turns easily in any footing . . . climbs out of deep ruts, over boulders, or thru soft materials. Power-steering is smooth, effortless, foolproof, effective . . . unit saves seconds at every operator "command".

Instant-action controls

On C Fullpak, your operator not only steers . . . but also positions scraper bowl, apron and tailgate with the smooth, clean, *instant* power of electricity. Any desired movement takes only a touch of a fingertip on an electric switch. Instantly, flexible, insulated cables carry electric power from generator to high-torque motors at point-of-action. Motors start, stop, or reverse in a split-second to give precise control of steering and scraper functions. No other control is so easy, fast, sure and safe. There's no hesitation . . . no waiting for power. You have perfect, instantaneous control that saves seconds on each cycle.

Operators hustle more yardage

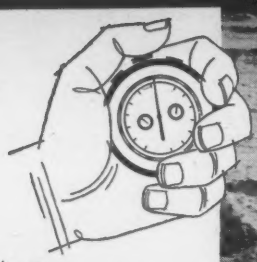
With excellent all-around visibility, your operator moves dirt at Tournapull's higher speeds with confidence. Big ground-gripping tires make C Fullpak sure-footed under all conditions. Low center of gravity assures stability on hills and curves. Smooth, instant-acting, extra-large, multi-disc air-brakes provide safe control on any haul surface, in any weather. On narrow winding roads, on steep grades, near other equipment, operators are sure of control and maneuverability. They just naturally haul faster, return faster . . . hustle more yardage in the seconds saved in each hour.

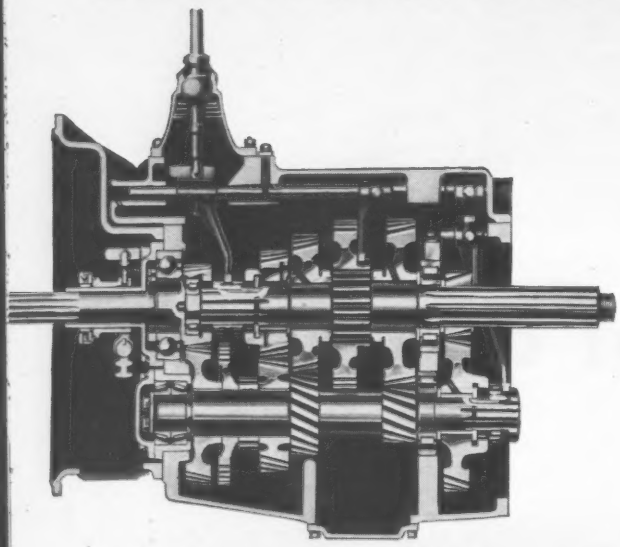
Bonus ways to boost dirtmoving earning power . . . see next page

(continued)

Save extra seconds...hours ...days...dollars with

your choice of engine and transmission

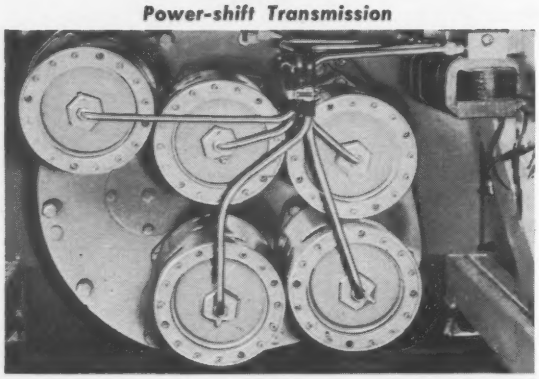




Step-gear Transmission

Your choice:
Power-shift or step-gear transmission to save seconds on your kind of jobs

Power-shift Transmission



For maximum productive returns on your investment in C Fullpak*, choose either power-shift or step-gear transmission. Your normal job conditions will determine which transmission will save seconds and move dirt faster... which will give you more payloads per day for more profit. The LeTourneau-Westinghouse Distributor will be glad to help you determine the most practical transmission for you.

5-speed step-gear

This conventional, manual-shift transmission is a Fuller 5A-1120, similar to that used on many 12 to 18-yd. self-propelled scrapers. It's geared to give you the extra pull-power you need during loading, and in starting the load... extra speed on good haul roads. With engine rpm of 2000, Fullpak works and travels at:

1st gear	2.9 mph	4th gear	19.0 mph
2nd gear	6.2 mph	5th gear	29.9 mph
3rd gear	10.8 mph	reverse	3.8 mph

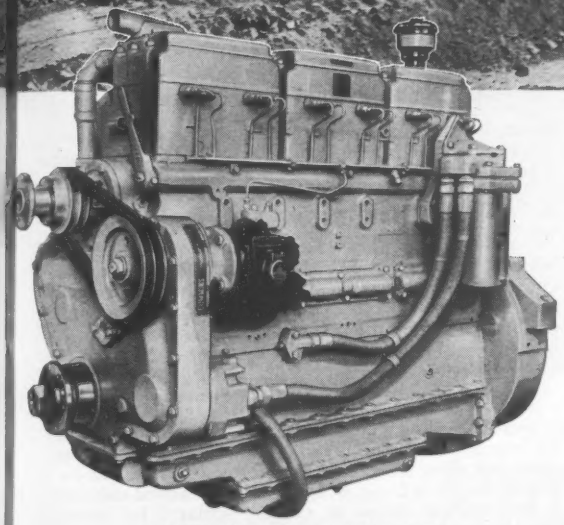
Optional ring-gears available for this transmission to increase top speed to 40 mph.

Power-shift with torque-converter

You can power-shift this transmission instantaneously, from one gear range to another, without clutching, synchronizing, or clashing gears. It makes *all* your operators *good* operators. When you move a small speed-selector lever, air-actuated clutches *automatically* operate selected gear-range. At all throttle settings, torque-converter *automatically* proportions speed and power, increases torque for maximum pull on hard work... increases travel speed as less "muscle" is needed. Speed-ranges, with engine turning 2000 rpm, are:

	Forward	Reverse
1st gear	0.0 to 2.2	0.0 to 4.8
2nd gear	0.0 to 5.0	0.0 to 11.0
3rd gear	0.0 to 11.4	
4th gear	0.0 to 26.1	

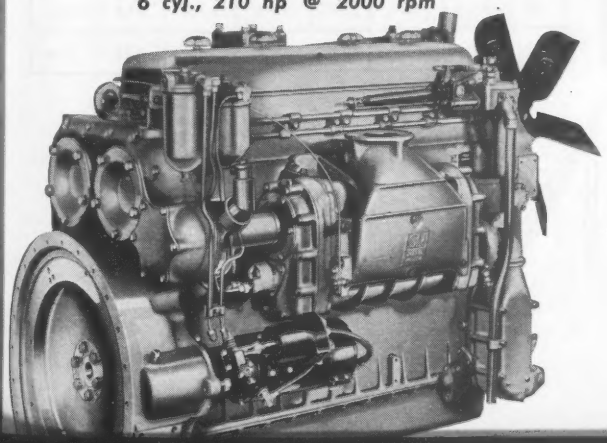
Two C Tournapulls owned by Frank Montgomery, Midland, Texas, carved-out 180' x 225' x 33' deep boat basin in sand and sandrock at Lake Thomas, Texas. "Nothing can compare with Fullpak's loading ability," reports Supt. Stephenson. "As a former operator, I know they'll move more dirt, and move it faster than other scrapers."



CUMMINS Model HB1S-600
6 cyl., 200 hp @ 1800 rpm

Your choice:
GM or Cummins engine,
to speed servicing
. . . cut downtime

GENERAL MOTORS Model 6-71
6 cyl., 210 hp @ 2000 rpm



You may find that the *make* of diesel engine you specify for your self-propelled scraper is important . . . that a choice can save you hours — maybe days — of production downtime. It may also save considerable maintenance expense. That's why C Tournapull® prime-mover is offered with *your* choice of engine.

For C Fullpak, you may specify either of these field-proven engines . . . 210 hp General Motors, or 200 hp Cummins. Pick whichever power plant you find better for your particular operation and locale. You can standardize your fleet on one make or the other . . . improve parts availability while reducing parts inventory. You can pick the engine that your mechanics find easier to service . . . one that your operators like better . . . or one that has given you good service in the past.

The choice is yours . . . to up-grade fleet operating efficiency, and thereby increase dirtmoving output . . . to improve your immediate and future profit potential.

Ask for a demonstration . . . and see this 18-yd. C Fullpak get big, well-packed loads fast . . . watch it deliver these jumbo payloads on a regular high-speed schedule. Feel free to write or call us at the factory, or to talk it over with the LeTourneau-Westinghouse Distributor in your local area. *Trademark CP-1539-DC-6

LETOURNEAU-WESTINGHOUSE COMPANY

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

"Where quality is a habit"

HOW JIM GUENTHER DUG TWO BASEMENTS MILES APART IN 7 HOURS, 45 MINUTES

Ann Arbor, Michigan—Two basements in one day with a BAY CITY Model 30—½ yard hoe . . . that's the story told here by Guenther Brothers, excavating and grading contractors. "Differential steering with plenty of turning power", reported Jim Guenther, "makes maneuvering the machine around corners and tight spots a cinch."

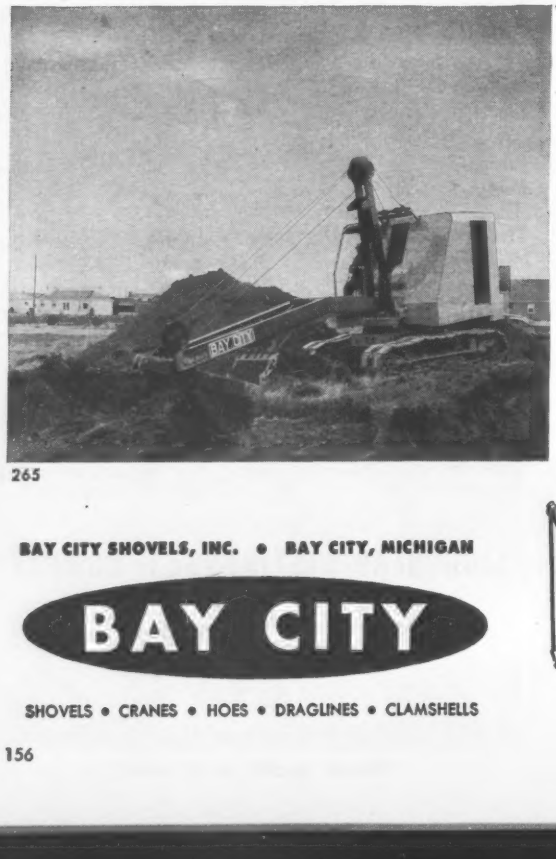
First Excavation 315 Yards

At 8:00 A.M. Guenther Brothers started the first excavation, moving 315 yards of dirt.

The job was completed in just four hours and fifteen minutes. The BAY CITY hoe was then loaded onto a low-boy. After lunch, the equipment was hauled to the second site, arriving there at 1:15 P.M.

Second Basement Dug in Less Time Than First

In just 3 hours and 50 minutes the second excavation was complete, including the entire job of reloading the equipment. Size of the second job: over 300 yards of dirt!



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BAY CITY Hoe's Fuel Consumption Low

In moving the sum total of some 615 yards of dirt (total work time, 7 hours and 45 minutes), Guenther reported that the BAY CITY hoe used approximately 18 gallons of diesel fuel, representing a considerable saving over the 30 gallons used by other machines, on the same type jobs.

With a work-record like this, it is little wonder that Guenther Brothers reputedly have dug and back-filled an estimated 50% of all house basements in the Ann Arbor area during the past ten years.

A Few of The BAY CITY Features

• Two-shoe swing clutches with cast iron friction wheels for best heat dissipation and resistance to wear • One-piece cast alloy steel bases for greater strength and desirable weight • Long, wide crawlers for added stability • Ball-bearing drums in tandem actuated by power booster clutches for easiest operation • Helical cut gears for main power give quiet, smooth operation • Self locking worm and worm wheel boom hoist raises or lowers boom under power • Choice of large cubic inch displacement gas or diesel engines provide maximum power • Heavy duty differential permits sharp or gradual turns with power on both crawlers • Available attachments to operate as crane, clamshell, dragline, shovel, hoe.

BAY CITY Specifications and Catalogs Available

Model	Rated Capacity	Maximum Bucket Width	Boom Length	Maximum Digging Depth	Maximum Reach	Rated Net H.P.	Catalog
30	½	36″	17′0″	17′6″	26′5″	57	30-I
45	¾	42″	20′0″	22′0″	32′4″	76	45-I
60	1	50″	22′0″	23′3″	34′9″	113	60-B
71	1½	54″	26′0″	26′8″	39′5″	123	71-A

BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

(Continued from page 148)

Pa., Newtown Square—SCHOOL—Newtown Twp. School Dist., Newtown Square, plans by Baader Young & Schultze, 1500 Walnut St., Phila., elementary school, Goshen Rd. $509,900. Chester I. Duncan, 225 S. 15 St., Phila., Pa., consult. engr.

Tex., Baytown—AUDITORIUM—Goose Creek Independent School Dist. Plans by Lowell Lamers, Baytown, Robert E. Lee High School auditorium. $500,000. Broyles & Bynum, Baytown, consult. engrs. CD 7/2.

Tex., Baytown—SCHOOL—Goose Creek Consolidated Independent School Dist. plans by Dan Perkins & Jack Reber, Baytown, Junior High School, in Highlands $880,000. Broyles & Bynum, Baytown, consult. engrs. CD 6/19.

Tex., Houston — OFFICE — Houston-Harris County Ship Channel Navigation Dist., 1519 Capitol St., plans by Wilson, Morris & Crain, 3330 Graustark St., port commission office bldg. $500,000. Walter P. Moore, 2 Pinedale St. and Cook & Halle, 2706 Richmond St., consult. engrs. CD 2/7, under Unclassified.

Tex., Levelland — AUDITORIUM, etc. — Hockley Co. Junior College, c/o Lamar West, chn., plans by Haymes & Kirby, 1902 Dixie Dr., Lubbock, classrooms bldg. $500,000; auditorium-library $400,000. CD 7/23.

Tex., Levelland—AUDITORIUM-LIBRARY—Levelland Independent School Dist., voted bonds July 13, auditorium-library. $400,000. CD 7/14/54.

▲ Tex., Lubbock—DORMITORIES—Texas Technological College, Lubbock, plans by Atcheson & Atkinson, 204 Sanford Bldg., 268 dormitory $1,250,000; 200 dormitory $750,000; 250 student dormitory $915,000. CD 7/25.

Tex., Nacogdoches—FINE ARTS, etc.—State Control Bd., State Capitol, Austin, fine arts bldg. $600,000, auditorium $400,000; for Stephen F. Austin State College. Constr. 1958. CD 10/16/50.

Utah, Ephriam—COLLEGE—Utah State Bldg. Bd., 419 State Capitol Bldg., Salt Lake City, plans by Willard C. Nelson, Box 704, Provo, Industrial Arts, Home Ec. and Music Bldg. for Snow College. $600,000.

Vt., Castleton—AUDITORIUM, etc.—State Bldg. Council, State House, Montpelier, plans by Webber & Erickson, 56½ Merchants Row, Rutland, auditorium, gymnasium, for Teachers college, $362,285. Constr. 1958.

Vt., Johnson—DORMITORY, etc.—State Bldg. Council, State House, Montpelier, plans by Roland M. Whitter, 108 Shelburne St., Burlington, dormitory, kitchen and dining room, Johnson Teachers College. $766,000. Constr. 1958.

Vt., Windsor—HEATING PLANT—State Bldg. Council, State House, Montpelier, plans by Julian Goodrich, 930 Shelburne St., Burlington, central heating plant for State Prison. $300,000. Cleverdon, Varney & Pike, 120 Tremont St., Boston, Mass., consult. engrs. CD 2/5/57. Constr. 1957.

† Wash., American Lake—CHAPEL—Veterans Admin., Pentagon Bldg., Wash., D. C., plans by G. W. Stoddard-Huggard & Assocs., 1120 Harvard Ave., Seattle, 57x105 ft., frame chapel American Lake Veterans Administration Hospital. $175,000. Bids this fall.

▲ Wash., Bellingham—SCIENCE—Western Washington College of Educ., Bellingham, plans by P. Thiry, 600 Columbia St., Seattle, Zone 4, science bldg. $2,300,000. CD 4/14/55.

▲ Wis., Appleton—SCHOOL—Bd. Educ. plans by George Narovec, 520 E. Wisconsin Ave., 2 story, H-shaped, 250 x 300 ft. Whispering Pines Elementary School, $1,000,000. CD 9/26.

COMMERCIAL BUILDINGS

▲ Ala., Mountain Brook—HOMES—Joe W. Brown Co., 4353 Mountaindale Rd., Birmingham, 120 homes. $1,500,000.

▲ Ariz., Phoenix—MARKET, etc.—Albert Adelman, Bank of Douglas Bldg., plans by Joe Grabner, 2624 W. Orangewood Ave., 150-shop farmer's market bldg., amusement park, $1,500,000.

Ark., Searcy—APARTMENT—Harding College, Searcy, 3 apartment bldgs. $500,000. CD 4/26/48.

▲ Calif., Claremont—DORMITORIES, etc.—Webb School of California, Claremont, plans by Allen G. Siple, 9501 Santa Monica Blvd., Beverly Hills, dormitories, cottages, laboratory, museum, gymnasium, dining hall, administration bldg., athletic facilities, etc. $2,500,000.

▲ Calif., Red Bluff—HOME SUB-DIVISION—Group of Investors (Howard Pulliam, Representative), 725 Pine St., 400 home sub-division, sewage treatment plant and shopping center on 140 acre site. $5,500,000.

▲ Calif., San Carlos—APARTMENTS—Stanley Burney, 1678 Wolfe Dr., San Mateo, 280 unit apartment development at San Carlos Estates. $2,250,000.

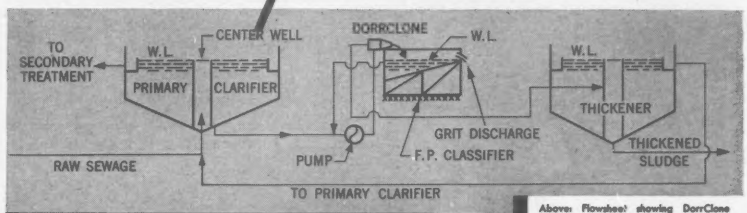
Conn., Greens Farms—SCHOOL, etc.—New Roman Catholic Parish, c/o Bishop Lawrence J. Shehan, 359 Washington Ave., Bridgeport, school, church, convent, Long Lots Rd. $350,000.

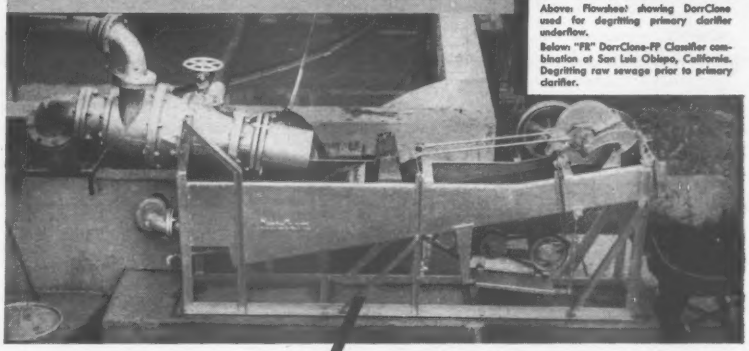
Conn., Norwalk—COMMUNITY CENTER, etc.—Norwalk Jewish Center, 17 West Ave., South Norwalk, community center and gymnasium. $355,000.

Conn., Stratford—SHOPPING CENTER—Food Fair Stores Inc., 2223 E. Allegheny Ave., Phila., Pa., plans by Lathrop Douglass, 518 Fifth Ave., New York, N. Y., 1½ story, 57,240 sq. ft., shopping center, incl. 10 stores, Boston Ave. $628,463. CD 10/30.

▲ Conn., Windsor—SHOPPING CENTER—Dryfus Properties, 50 Federal St., Boston, Mass., shopping center, Highlands Section. $1,000,000.

IT'S NEW / It's from DORR-OLIVER





Above: Flowsheet showing DorrClone used for degritting primary clarifier underflow.

Below: "FR" DorrClone-FP Classifier combination at San Luis Obispo, California. Degritting raw sewage prior to primary clarifier.

THE DORRCLONE CLASSIFIER for degritting sewage

Proven for many years in a wide range of industrial and chemical processing applications, the DorrClone Classifier has now been adapted to the sewage treatment field for removing grit from raw sewage and settled sludge.

Essentially, the DorrClone is a compact cylindro-conical classification unit utilizing centrifugal force in place of gravity. In operation feed enters near the base of the cone tangentially, causing a vortex movement. Centrifugal forces throw the grit to the walls of the cone, where they collect, pass toward the apex, and discharge out of the unit through the apex opening or valve. The lighter grit-free sewage and sludge move to the inner spiral of the vortex where they are displaced into the vortex finder or overflow opening.

Full scale installations have proven that this unit is applicable to the degritting of raw sewage prior to primary sedimentation; the degritting of primary clarifier underflow prior to Densludge Thickening; and the washing of Detritor Collecting Tank discharge.

For more information on the new sewage applications of the DorrClone, write for a copy of Bulletin No. 2508 — just off the press — Dorr-Oliver Incorporated, Stamford, Connecticut.

DorrClone, Densludge, Detritor T.M. Reg. U. S. Pat. Off.

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PILE TESTING - PRESTRESSED CONCRETE
SPECIAL APPLICATIONS
ELGOOD EQUIPMENT CORP.
373 TEN EYCK ST., BROOKLYN, N. Y., HY 7-5445

▲ ..., Miami—HOTEL—Skyways Hotel Corp., Warren Freeman, pres., c/o Rader & Assocs., engrs.-archts., 111 N. E. 2 Ave., 10 story, 300-room, hotel, LeJeune Rd. and 18 St., near entrance of New Miami International Airport, $4,000,000.

▲ Ill., Chicago—DORMITORY—Clark College, Sisters of Charity of the B. V. M., Dubuque, Iowa, plans by Naess & Murphy, 80 E. Jackson St., dormitory, Sheridan Rd. at Kenmore. $1,500,000.

▲ Ill., Chicago—SHOPPING CENTER—Howard-Western Properties, c/o M. Dreyfus, 228 N. LaSalle St., plans by Sidney H. Morris & Assocs., 134 N. LaSalle St., shopping center, Howard and Western Aves. $1,500,000.

▲ Ill., Chicago—APARTMENTS, etc.—Webb & Knapp, 383 Madison Ave., New York, N. Y., plans by I. M. Pei, c/o owner, and Harry Weese, local archt., 104 S. Michigan St., Chicago, Zone 3, Hyde Park Project. incl. 800 living units, apartments and row houses, $15,000,000.

▲ Ill., Skokie—OFFICE—All State Insurance Co., Lincoln and Cicero Ave., plans by Dunlap & Esger, 333 N. Michigan St., Chicago, Zone 1, office, Grosse point Rd. and Edens Hy. $1,500,000.

Ind., Augusta—SHOPPING CENTER—Augusta Shopping Center, Inc., 3726 N. Penn St., Indianapolis, 1 story, 160 x 200 ft., masonry, steel roof shopping center. $345,000. H. A. Bogard, 1435 E. LeGrande Ave., Indianapolis, consult. engr.

▲ Iowa, Waterloo—HOSPITAL—Scholtz Memorial Hospital, c/o Supt., Waterloo, plans by Frederick W. Mast & Assocs., Waterloo, 4 story, bsmnt., 52x130 ft. hospital addn. $1,050,000. CD 6/24.

▲ Ky., Louisville—HOTEL—Sheraton Hotel, 505 N. Michigan St., Chicago, Ill., 500-600 room hotel. $10,000,000.

▲ La., New Orleans—BUS TERMINAL—Greyhound Corp., D. S. Morgan, dir. Southeastern Div., Lexington, Ky., bus terminal, on square bounded by Tulane Ave., S. Claiborne, Gravier and S. Derbigny Sts. $3,500,000.

La., Opelousas — HOTEL — Community Hotel, Inc., c/o Homer A. Rissman, archt., Santa Monica, Calif., 4 story hotel, incl. 60 guest rooms, banquet hall, dining room, cocktail lounge, coffee shop, swimming pool, etc. $550,000.

Mass., Ipswich—CHURCH, etc.—Ascension Memorial Church, Rev. C. Daniel Boone, rector, 3 High St., plans by Child-Lawrence & Shannon, 711 Boylston St., Boston, church and parish house, Walding Field Rd. and County Rd. $500,000. Constr. in 1958.

▲ Mich., Battle Creek—SHOPPING CENTER, etc.—William Holland & Dudley Fatner, 3101 4th St., Detroit, plans by Haughey, Black & Williams, 616 Post Bldg., Battle Creek, shopping center and apartment, Kellogg Estate. $2,000,000.

Mo., Jennings (St. Louis 21 P.O.)—SCHOOL, etc.—St. Lucy's Catholic Parish, Rev. Edwin J. Burmeister, pastor, and Archdiocesan Bldg. Comn., Rev. James R. Hartnett, exec. secy., 3810 Lindell Blvd., St. Louis, Zone 8, plans by Henry P. Hess, 4005 West Florissant Ave., St. Louis, Zone 7, 2 story, concrete, brick, bar joists, etc., chapel and school bldg. $350,000. Albert Alper, 6635 Delmar Blvd., University City, Zone 5, structural engr. Smith, Henlon, Zurbeide, Levy, Inc., 3926 Lindell Blvd., St. Louis, Zone 8, mech. engr.

▲ Mont., Helena — BANK — Union Bank & Trust Co., Helena, plans by Orr Pickering & Assocs., Fratt Bldg., Billings, 3 story, bsmnt., 70x160 ft., concrete frame with masonry facing bank bldg. $1,000,000. Bids expected this fall.

▲ N. J., Atlantic City—HOTEL—Paul Steiner & Assocs., Inc., 726 Chestnut St., Phila., Pa., preliminary plans, 10 story, masonry apartment hotel, Chelsea Section, Morris Ave. $4,000,000.

N. J., Long Branch—HOTEL—Frank Montemurro, 514 Greenmont Ave., Cresskill, hotel, North Bath Ave. $400,000.

▲ N. J., Sea Girt—HOTEL—Frank A. Palmieri, 311 Salem Ave., Spring Lake, 300 room hotel on site of burned out Stockton Hotel, Ocean Ave. $2,500,000.

▲ N. J., Thorofare—SHOPPING CENTER—Southwood Shopping Center, c/o Penfil Realty Co., Lewis Tower Bldg., Phila., Pa., att. S. Freedman & Berton Lewis, shopping center supermarket, 15 other stores, Mantua Pike. $1,500,000. Cox & Guttman, 709 Market St., Camden, archts.

N. J., Vineland—SCHOOL, etc.—Sacred Heart School, c/o Thomas Henry Moran, archt., Hillcrest Estates, P.O. Box 109, Princeton, school and gym. $344,000. Bids in August 1957.

▲ O., Cleveland Heights—HOUSES, etc.—Metropolitan Builders, Inc., 2623 Milton Rd., University Heights, plans by Milo S. Holdstein, 1030 Euclid Ave., Cleveland, Zone 15, 6 apartment houses, incl. 100-suites and 100-car garage, Rugby Court and Brookline Blvd. $1,250,000. Work to start in about 6 weeks.

O., Ravenna—SUPERMARKET—Perkey's, Inc., Alliance, supermarket bldg., E. Main St., near E. Bruce St. $500,000.

Okla., Ardmore—BOWLING ALLEY—Ten Pin Alley, Inc., Ardmore, bowling alley. $350,000.

Pa., New Castle—CHURCH, etc.—First Presbyterian Church, 125 N. Jefferson St., church and educational unit, $700,000.

▲ Pa., Phila.—HOSPITAL WINGS—Misericordia Hospital, 54 St. and Cedar Ave., plans by Edward L. Holland, 540 N. 17 St., two new hospital wings. $1,000,000. Bids in September. CD 3/29.

Pa., Phila.—HOME—Southern Home for Children, Broad and Morris Sts., plans by Howell, Lewis Shay & Assocs., Packard Bldg., home. $800,000. Keast & Hood, 2031 Chestnut St., engrs. CD 5/21.

Pa., Plymouth Meeting—CHURCH, etc.—Epiphany of Our Lord, Plymouth Valley, plans by Peter F. Getz, Lansdowne, church, school and convent. $344,000. Thomas J. McCormick, 123 S. Broad St., Phila., engrs. Bids soon. CD 1/21.

Tex., Del Rio—DWELLINGS—Del Rio Builders (L&S, Inc.) 800 Blk. W. 7th St., plans by DeVerne Kittles, 523 W. Hildebrand St., San Antonio, low priced dwellings, 40 to be on 4th and 5th Sts. and 9 on W. 7th St. $380,000.

Tex., Houston—OFFICE—First Federal Savings & Loan Ass'n., 1114 Capitol Ave., multi-story office, Fannin and Capitol. $750,000-$1,750,000.

▲ Tex., Houston—MOTOR HOTEL—Morin M. Scott, c/o Montague Hotel, Austin, site purchased for luxury motor hotel, west side of Main St., in Medical Center area, to be named "Tideland Hotel" $2,250,000.

▲ Tex., Houston—OFFICE—Texas Co., 720 San Jacinto, plans by Kenneth Franzheim, 802 Lovett St., 13-17 story office, Rusk, Fannin, and San Jacinto Sts. $4,000,000; auto parking facilities. $200,000; office concrete and earth fdn. work. $175,000. CD 6/10.

▲ Tex., Houston—HOSPITAL—Texas Institution for Rehabilitation & Research, c/o Texas Medical Center, 1133 M. D. Anderson Blvd., plans by Wilson, Morris, Crain & Anderson, 3330 Graustark, Houston, Tex., hospital. $1,350,000. CD 7/25.

Tex., Pasadena—OFFICE—S. E. B. Corp., c/o Don Shephers & Jack Blankfield, 616 S. Tatar St., Houston, plans by Irving R. Klein & Assocs., 1317 Austin St., Houston, 4 story office. $750,000.

▲ Tex., San Antonio — DWELLINGS — Robert Burns, Builder, 222 Northride Dr., plans by DeVerne Kittles, 523 W. Hildebrand St., 28 dwellings. $357,100, 30 dwellings. $368,000, 26 dwellings. $345,600, all speculative type, in East Terrell Hills.

Tex., San Antonio—DWELLINGS—Ray Ellison & Assocs., Builders, 186 Fennel St., 26 dwellings in "Lackland City", off Hy. 90 West. $363,000.

▲ Tex., San Antonio—MOTEL—Motor Hotel Corp., c/o Brown & Cown, archts., 6936 San Pedro Ave., motel. $4,000,000; enclosed auto parking. $100,000; rein.-con. swimming pool. $75,000, at San Pedro Ave. and Oblate Dr.

Tex., San Antonio—DWELLINGS—H. P. Orts, General Contractor, 112 Arvin St., 28 dwellings, Harry Wurzbach Rd. $358,450.

▲ Tex., San Antonio—DWELLINGS—John M. Schaefer, 311 Travis Bldg., plans by DeVerne Kittles, 523 W. Hildebrand St., 55 low price dwellings $357,500; 50 low priced dwellings $350,000; 40 low priced

(Continued on page 160)

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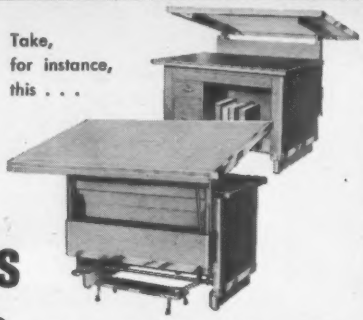

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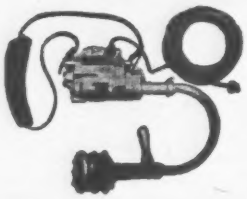

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(Continued from page 158)

dwellings $355,000; 45 low priced dwellings $347,500, all speculative type, located on southside of city.

Tex., Sherman—DIVISION CENTER—Texas Power & Light Co., c/o Fidelity Union Life Bldg., Dallas, Company Division Center, 20 acre tract on Woodlake Country Club Rd. $350,000.

▲ **Tex., Weslaco**—HOSPITAL—Southwest Texas Methodist Conference, c/o Frank Smith, chn., 1049 Kirby Dr., Houston, plans by R. Newell Waters, Clark & Tomlinson, 1st National Bank Bldg., 75-100-bed hospital. $1,500,000. CD 10/17.

Vt., Northfield—DORMITORY—Norwich University, Northfield, plans by Milton L. Crandell, 5 Grove Ave., Glens Falls, N. Y., dormitory. $450,000. CD 7/23.

B. C., Vancouver—OFFICE—Owner, c/o H. Bell-Irving & Co., Ltd., 926 W. Pender St., plans by G. Hamilton, 1280 W. Pender St., 5 story, 131x155 ft., rein.-con. medical-dental office, 1000 block Davie St. $600,000.

▲ **Ont., Toronto**—HOSPITAL—Northwestern Hospital, 2175 Keele St., hospital expansion. Over $1,000,000.

▲ **Ont., Toronto**—HOSPITAL—Scarborough General Hospital, Lawrence Ave. E., hospital expansion. Over $1,000,000.

▲ **Ont., Toronto**—Y.M. & Y.W.H.A.—Young Men's & Young Women's Hebrew Assn., 750 Spadina Ave., Y.M. and Y.W.H.A. building in North York. $1,500,000.

INDUSTRIAL BUILDINGS

Ark., Little Rock—GARAGE—Van Grant & Co., Van Grant, pres., c/o H. Allen Gibson, archt., Riegler Bldg., 84,000 sq. ft. 4 deck parking garage bldg. to incl. drive-in banking facilities on 1st floor and office space on second floor for Worthen Bank & Trust Co. of Little Rock. $250,000.

▲ **Colo., Boulder**—FACTORY—International Business Machines Co., 590 Madison Ave., New York, N. Y., factory bldg. for production of wiring sys. for IBM electronic machines. $2,000,000.

Conn., Middlebury—INDUSTRIAL—General Ice Cream Corp., 176 Watertown Ave., Waterbury, plans by Leo F. Caproni, 132 Temple St., New Haven, 2 story, 100x200 ft., masonry industrial bldg. $200,000.

Conn., New Haven—PLANT—Comn. Malleable Casting Co., 151 East St., plans by Leo F. Caproni, 132 Temple St., 2 story, 22,000 sq. ft. masonry castings and electrical fittings mfg. plant. $220,000. Bids in about 3 weeks. CD 7/25.

Ill., Chicago—FACTORY—Ideal Furniture Mfg. Co., 9160 S. Green St., plans by L. R. Solomon & Assocs., 61 W. Superior St., 1 story, brick furniture factory, 9150 S. Green St. $225,000.

Ill., Franklin Park—PLANT, etc.—Inland Container Corp., 700 W. Morris St., Indianapolis, Ind., 2 story corrugated box mfg. plant and office, Grand Ave., near here. $200,000.

Ill., Libertyville—FACTORY—Frank G. Hough Co., div. International Harvester Co., Libertyville, 30,000 sq. ft., steel frame factory, $325,000. Sessions Eng. Co., 1 N. LaSalle St., Chicago, Zone 2, engrs.

Ill., North Chicago—WAREHOUSE—Abbott Laboratories, Sheridan Rd. and 14th St., plans by Battey & Childs, 231 S. LaSalle St., Chicago, 1 story, 30,000 sq. ft. warehouse addn., Sheridan Rd. and 14th St. $250,000.

Ill., St. Charles—PLANT—DuKane Corp., 100 N. 11 St., 1 story, 67,000 sq. ft. plant addn. (electronic equipment mfrs.). $350,000.

Ill., Skokie—PLANT—Standard Rate & Data Service, 1740 Ridge St., Evanston, plans by Maher & McGrew, Evanston, 1 story, 26,000 sq. ft. production bldg., 39,000 sq. ft. office bldg., connected bldgs. on 7 acres S.W. corner Harrison and Edens Expressway, $400,000.

Ind., East Chicago—ENGINEERING OFFICE—Cities Service Oil Co., Cline Ave., plans by Biene Hall & Curran, 607 Broadway, Gary, 1 story, brick engineering office bldg., Cline Ave. $225,000.

▲ **Iowa, Cedar Rapids**—PLANT—Collins Radio Co., 855 35 St. N. E., plant. $2,750,000.

Ky., Lexington—FREIGHT DEPOT—Louisville & Nashville R.R. Co., H. C. Forman, ch. engr., 908 W. Broadway, Louisville, Zone 1, 10,000 sq. ft. freight depot addn. $100,000.

Mass., Lawrence—MILL—Greater Lawrence Industrial Assocs. Inc., 500 Broadway, remodeling work 73,000 sq. ft. Arlington Mills Bldg. No. 6, $500,000-$750,000. Northeast Service Center, Internal Revenue Service, 6 Lake St., lessee. Bids August 1957.

Nebr., Omaha—PLANT—John Roth & Son, 5502 S. 43 St., plans by Willis Regier, Live Stock Exchange Bldg., meat packing plant addn. $150,000. Bids shortly.

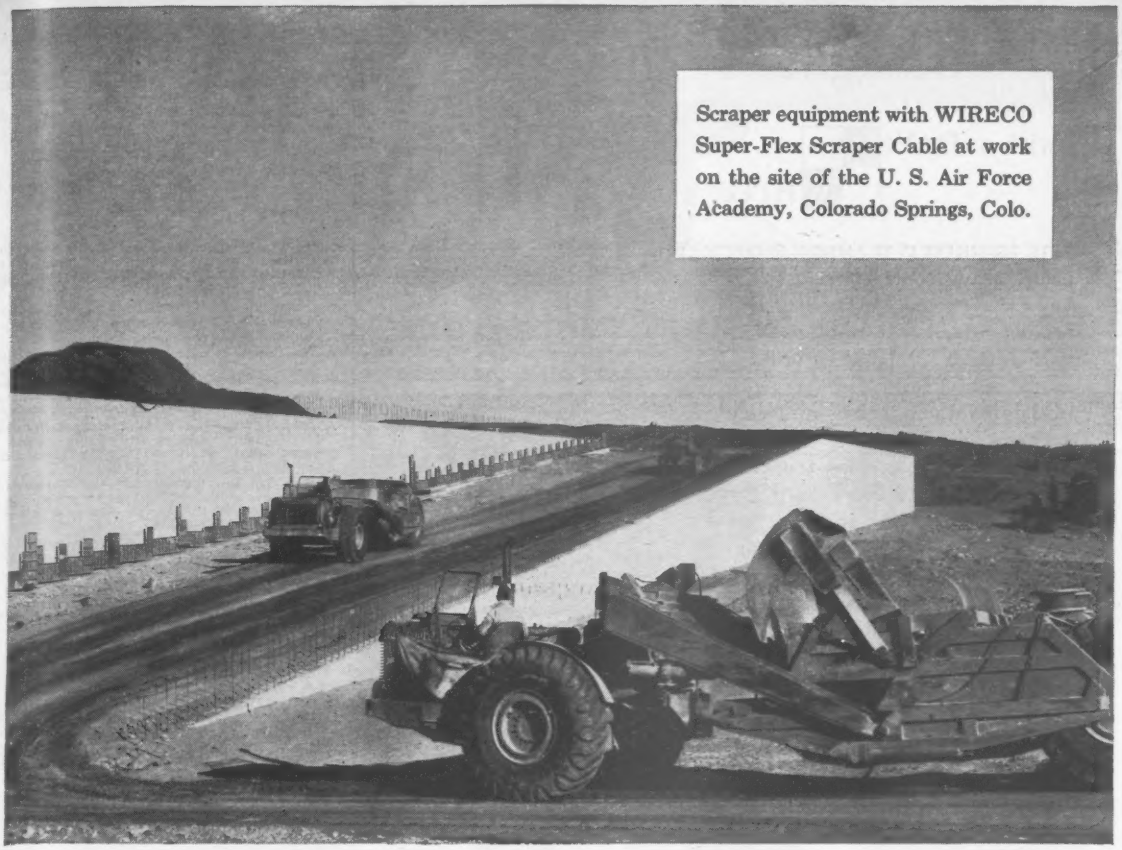
▲ **O., Cleveland**—MINE DEVELOPMENT—International Salt Co., Scranton Life Bldg., Scranton 3, Pa., salt mine development in Lake Erie, incl. 2,000 ft. deep mine shaft, six 7 story braker house, power house, loading, bagging and office facilities, railroad tracks, $7,500,000.

▲ **Pa., Duquesne**—ROLLING MILLS, etc.—United States Steel Corp., 71 Broadway, New York 6, N. Y., 3 rolling mills, 46 in. high lift slabbing-blooming mill, 36-in. blooming mill and 4 stand continuous 21-in. billet mill, incl. 2 vertical and 2 horizontal stands, 7 banks, soaking pits, stripper bldg.

▲ **Pa., King of Prussia**—MANUFACTURING—ITE Circuit Breaker Co., 445 N. 19 St., Phila., manufacturing bldg., 15-acres, $1,000,000.

Pa., Phila.—TERMINAL, etc.—Trans-American Properties, Inc., 1700 Waterman Ave., Detroit, Mich., plans by John F. Surman, 3580 Cornell Dr., Dayton, O.,

(Continued on page 162)



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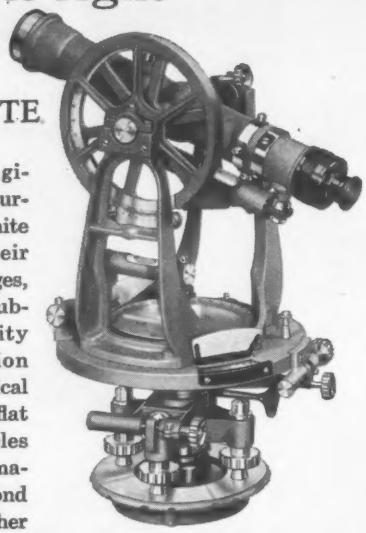

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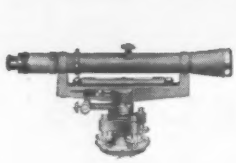

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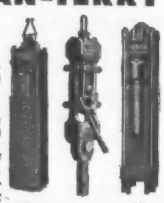

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(Continued from page 150)

terminal, garage-office bldg. and loading dock, $250,000. Bids soon. CD 8/6/53.

▲ **Pa., Whitemarsh**—LABORATORY—McNeil Laboratories, 2900 N. 17 St., Phila., laboratory facilities, 80-acre tract, $1,000,000.

▲ **Tenn., Memphis**—FACTORY—Stauffer Home Reducing Plan, 250 N. Juanita St., Los Angeles, Calif., factory to make aluminum and leather posture rest 'Magic Couches' to aid in controlling weight. $1,000,000.

Tex., Garland—PLANT—The Geotechnical Corp., 3712 Haggar Dr., Dallas, plant (mfg. and designs instruments used in electronics and geophysical fields) 10 acre site on Shiloh Rd. $400,000.

Tex., Houston—PLANT—John L. Dore Co., 5406 Schuler St., steel masonry plant expansion, $250,000.

Tex., Houston—STORAGE, etc.—Gulf Oil Corp., c/o Gulf Bldg., 2 story storage and sales bldg., Payson St. and Almeda Rd. $250,000.

Tex., Houston—SHOP—Halliburton Oil Well Cementing Co., c/o J. Wayne Holland, consult. engr., 4209 Leeland St., shop. $125,000.

▲ **Tex., Mount Pleasant**—REFINERY—American Petroleum Co. of Texas (subsidiary of American Petrofina Inc.,) c/o Mercantile Securities Bldg., Dallas, expansion of existing refinery to add a catalytic reformer, alkylation unit and related facilities. $3,000,000.

▲ **Tex., Sherman**—PLANT—Standard Oil Co. of Texas, c/o Mercantile Securities Bldg., Dallas, expansion of owners Natural gas processing plant in Sherman Field, near here, Grayson Co. $1,250,000.

▲ **Utah, Salt Lake City**—PLANT—Sohio Petroleum Co. (subsidiary of Standard Oil Co. of Ohio) Midland Bldg., Cleveland, O., catalytic cracking plant in area "Asphalt Ridge" $1,500,000.

▲ **Utah, Vernal**—PLANT—Sohio Petroleum Co., (subsidiary of Standard Oil Co. of Ohio) Midland Bldg., Cleveland, O., field gas processing plant in area "Asphalt Ridge" $1,000,000.

Wis., Milwaukee—FACTORY—American Can Co., 6000 N. Teutonia Ave., 1 story, 186x254, ft. and 23x186 ft. factory addn. $500,000, A. C. Eberhard, c/o owner, consult. engr.

▲ **Man., Winnipeg** — WAREHOUSE — International Harvester Co. of Canada Ltd., 301 Burlington St. E., Hamilton, Ont. Plans by Kyles & Kyles, 247 John St. S., Hamilton, Ont., 1 story, 100,000 sq. ft., steel frame, masonry warehouse, 44-acre site in Transcona, $1,000,000.

Ont., St. Thomas—PLANT—Thor Power Tool Co. of Canada Ltd., subsidiary of Thor Power Tool Co. Ltd., Prudential Plaza, Chicago 1, Ill., U. S. A., 20,000 sq. ft. plant on 4½ acre site. $200,000.

UNCLASSIFIED

▲ **California**—HONOR CAMP—State Div. Architecture, 1120 N. St., Sacramento, constr. forestry honor camp Mendocino Co., $550,000; forestry honor camp, Tehama Co., $550,000 for Dpt. Correction.

▲ **Calif., Oakland**—STADIUM—Alameda Co., c/o Director P. Wks., Courthouse, stadium on 140 acre site, Hayward, San Leandro Area. $38,500,000.

Calif., Redwood City—BOAT HARBOR—W. L. Cash, 71-5th St., private boat harbor at Redwood Creek and Steinberger Slough. $500,000.

▲ **Calif., San Francisco**—DRY DOCK—Bethlehem Steel Co., 20th and Illinois St., 45,000 ton dry dock, South San Francisco. $18,000,000.

Conn., Norwalk—PARK—City, City Hall, Norwalk, enlarging Seaview Ave. Park and constr. several marinas for 500 boats adjacent to park, airstrip adjacent to park 4,000 ft. long, South Norwalk, $100,000.

Minnesota—RURAL DISTRIBUTION LINE—Northern Electric Co-Operative Assn., Virginia, 158 mi. rural distr. line, 27 mi. k. v. transmission line, 16 mi. tie line, etc. in St. Louis Co. $225,000. REA granted $1,510,000 loan.

▲† **N. Y., New York**—TUNNEL—General Services Admin., P. Bldg. Service, 18 and F Sts. N.W., Wash. 25, D. C., underground passage tunnel which will connect the General Post Office and Morgan St. Post Office Bldgs. $1,300,000. Rudolph F. Schaefer, 251 W. 42 St., New York, N. Y., consult. engr. CD 5/20, under Public Buildings.

Tex., Anahuac—POWER PLANT UNIT, etc.—City, H. James, mayor, electric power plant unit. $700,000; electric distr. sys. $150,000.

Tex., Brenham—COLISEUM, etc.—City, City Hall, coliseum and stage. $500,000.

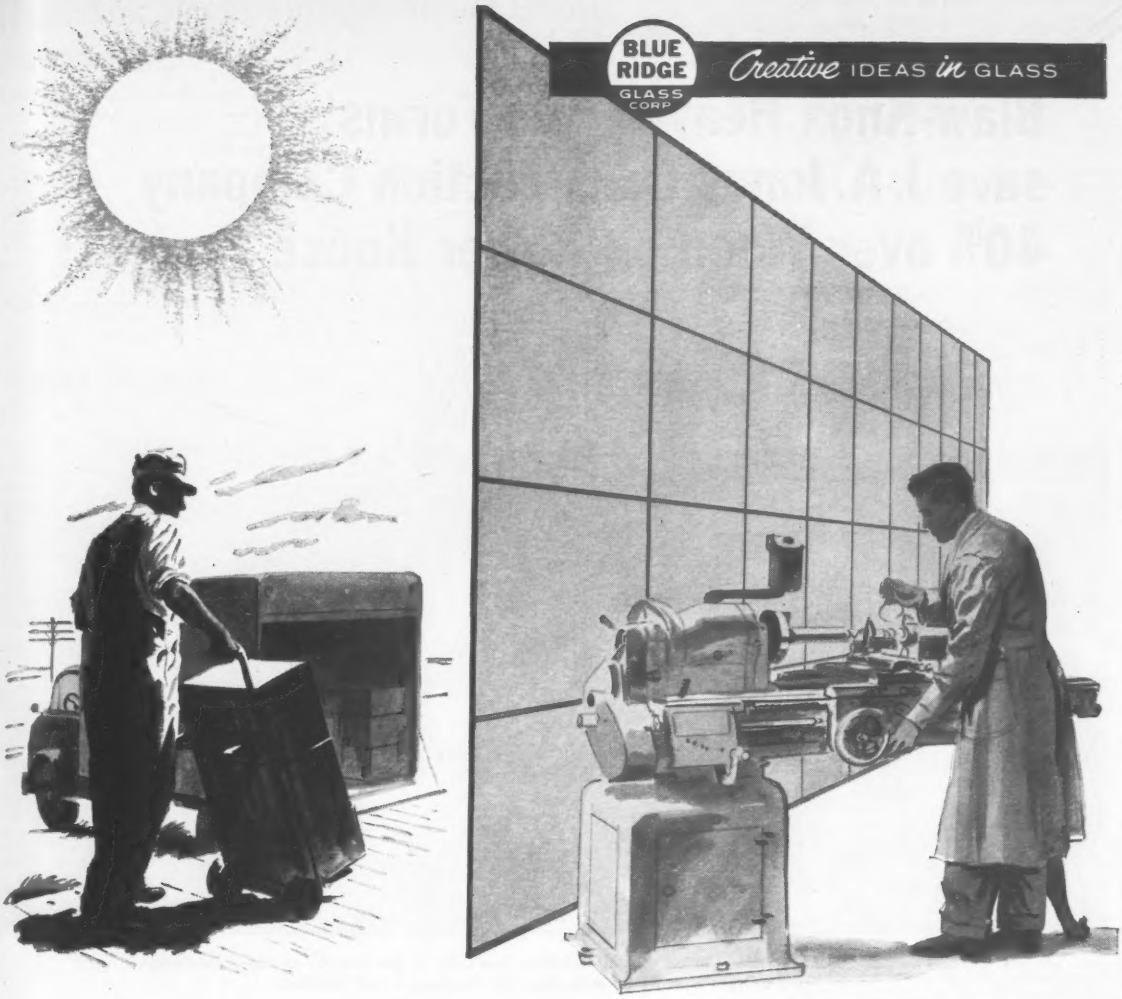
Tex., Houston—AUTO PARKING—Morin M. Scott, c/o Montague Hotel, Austin, auto parking, on west side of Main St. in Medical center Area. $250,000.

Tex., San Antonio—POWER UNIT IMPRVS.—City Pub. Service Bd., Navarro and Villita Sts., plans by O'Neil Ford & Assocs., 528 King William St., rebuilding new bsmnt. and fdn., for power unit for Old Villita St. Power Plant Unit. $100,000. W. E. Simpson Co., 945 Milam Bldg., and Will D. Simpson, 3707 Broadway, consult. engrs.

Utah—PIPE LINE—Sohio Petroleum Co. (subsidiary of Standard Oil Co. of Ohio) Midland Bldg., Cleveland, O., pipe line in area "Asphalt Ridge" Vernal. $500,000.

Que., Farnham—GOLF COURSE, etc.—Owner, c/o Maurice Archambault, lawyer, 322 Principale St., golf course and golf club. $100,000.

Que., Montreal—MODEL ARENA—City, City Hall, plans by Duplessis, Labelle & Derome, 822 Sherbrooke St. E., model arena, Parc Villeray east of Christophe Colomb, $500,000.



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People work better — and are happier — in natural daylight.

But, sun glare must be controlled to relieve eyestrain and increase employe efficiency. Windows become *diffused light panels* when you glaze them with Blue Ridge *Patterned Glass.*

Blue Ridge Glass is semi-transparent, with distinctive geometric, linear or indefinite patterns. Six patterns are made in hexagonal mesh Wired Glass for greater resistance to fire hazards. For control of *both* sun glare and sun heat, Blue Ridge Frosted AKLO* Glass is recommended. This blue-green, heat absorbing glass in ¼" thickness shuts out as much as 44% of the sun's radiant heat energy.

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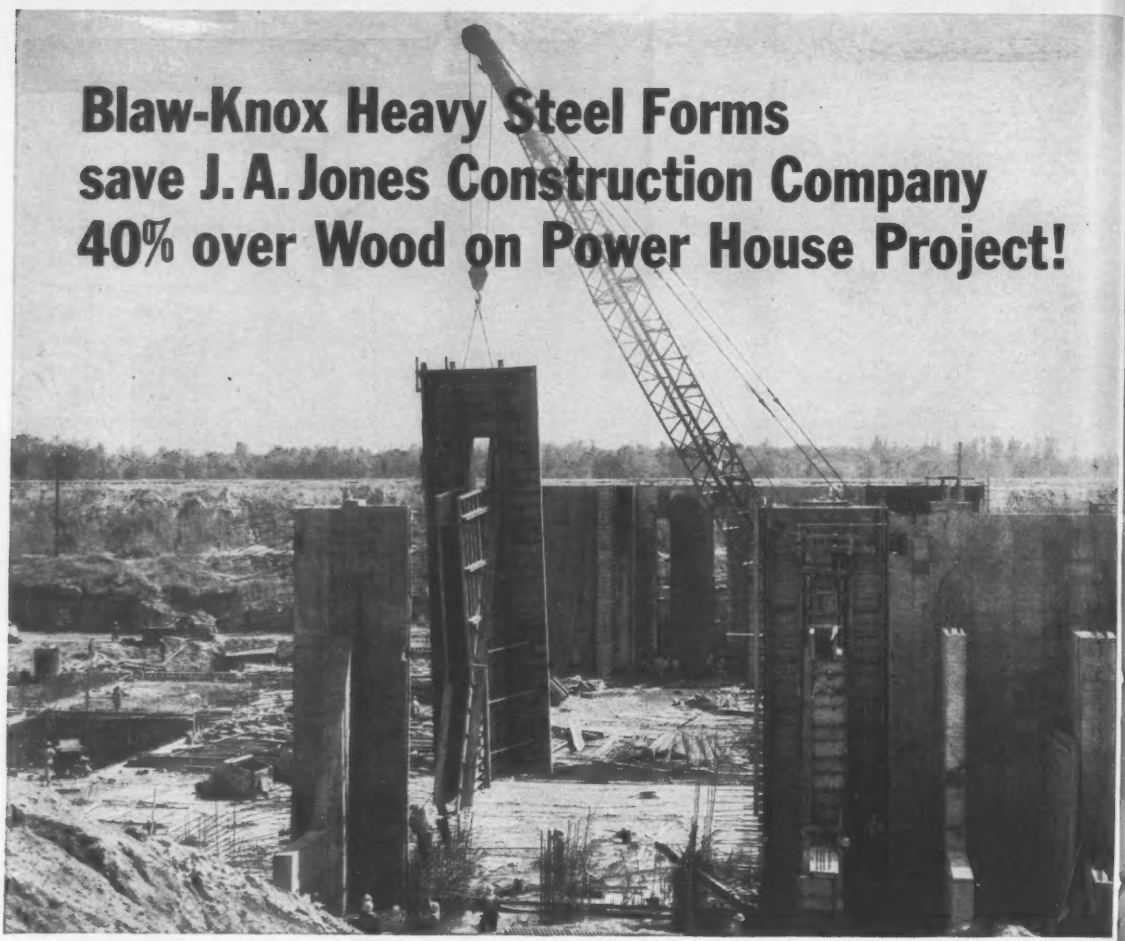
Blaw-Knox Heavy Steel Forms save J. A. Jones Construction Company 40% over Wood on Power House Project!



Backwall and counterfort form being placed. Handling time is cut to the bone by special form design. Form at right is ready for stripping and re-setting at new location.

Down along the banks of McKellar Lake at Memphis, one of the world's largest Steam Generating Stations is under construction. The J. A. Jones Construction Company, builder of the huge concrete substructure is using custom-built Blaw-Knox Heavy Steel Forms on a retaining wall that is 1,684 feet long and 41 feet high. They also are using Blaw-Knox Heavy forms for water intake, circulating and discharge tunnels.

Experience with more than 700 feet of wall shows that re-use of two sets of Blaw-Knox Steel Forms has actually saved 40% over the use of wood. Beyond this too, are the indirect advantages—safety, labor cost, uniformity of construction and salvage.

Advantages of custom-built Blaw-Knox Heavy Steel Forms have been proven on many construction projects of world wide interest. Where there is a concreting problem, the speed, flexibility, and salvageability of Blaw-Knox Steel Forms makes them the number one construction tool. They're backed by more than 40 years of experience on wide range of big projects.

Put the Blaw-Knox Steel Forms Consultation Service to work for you, whether your job is a dam, tunnel, sewer, or bridge. You'll get fast, simplified planning, custom-built forms tailored to the exact requirements of your project.

BLAW-KNOX

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Blaw-Knox Equipment Division

Steel Forms Department, Pittsburgh 38, Pa. • Phone STerling 1-2700

Bids—Low Bids—Contracts—Second Edition

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
August 27 Massachusetts

BUILDINGS—LB & CA

▲ **Perini Corp.**, 73 Montwait Ave., Framingham, Mass. CA Approx. **$5,500,000**, general contract PLANT exten., NORTH ANDOVER, MASS. Western Electric Co., Inc., 195 Broadway, New York, N. Y. Grand total $6,975,000. Bids June 18. CD 8/7, under LB; **Turner Constr. Co.**, 38 Newbury St., Boston, Mass. CA **$675,000**, foundations (North Andover, Mass.); **Bethlehem Fabricators, Inc.**, 49 Franklin St., Boston, Mass. CA **$800,000**, steel for plant (North Andover, Mass.).

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 20 Maryland, New Jersey
August 30 Pennsylvania
STREETS AND ROADS
August 20 Maryland — August 21 Delaware
August 30 Pennsylvania

BUILDINGS—BA

▲ **N. J., Perth Amboy**—HOUSING—BA About 8/15—Harbor Terrace Co. Inc. (Nassau Management Co.) 2 Park Ave., New York, N. Y. (selected list of bidders), five 5 story brick buildings containing 275 apartments on Water, Front, Rector and Smith Sts., as Willocks redevelopment, $3,300,000, S. J. Kessler, 555 Fifth Ave., New York, N. Y., archt.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—John W. Johnson, supt., Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany, bids opened 8/8.

N. Y.—Bero Construction Corp., P.O. Box 70, Waterloo, N. Y., LB **$958,275.** Est. $1,120,000 (6 bidders) 5.39 mi. road Rte. 370 from Yellow Red Corners at Rte. 104 southeast, south of Westbury and to Rte. 370, Victory, Cayuga and Wayne Counties.

N. Y.—Louis Mayersohn, Inc., 36 State St., Albany, N. Y., LB **$1,112,033.** Est. $1,424,000 (8 bidders) reconstr. 4.11 mi. sect. Rte. 3 Carthage north village line extending north to point 0.75 mi. northeast of Rte. 26 intersection, Jefferson Co.

N. Y.—Davis-Tuckahoe, Hicksville, N. Y., LB **$4-,811,987.** Est. $5,355,000 (2 bidders) 1.44 mi. six lane divided hy. Horace Harding Expressway and seven grade separations between Willis Ave. and Guinea Woods Rd., 5½ mi. service roads, parkway connections and access ramps, Nassau Co. CD 10/13/52.

N. Y.—Stanley DiStefano & Sons, 594 Broadway, Watervliet, N. Y., LB **$406,639.** Est. $445,000 (7 bidders) relocating and reconstructing 1.71 mi. Rte. 8, Clayville, Oneida Co.

N. Y.—No bids received 8/8/57. Est. **$600,000** wid'n., resurf. 3.53 mi. sect. Rte. 7 between Wells Bridge and Otsego, incl. widening two bridges, Otsego Co.

N. Y.—Robert M. Murray, Inc., Syracuse, N. Y., LB **$377,580.** Est. $405,000 (3 bidders) 0.62 mi. eastbound and 0.84 mi. westbound lanes and access roads Rte. 17 East Corning incl. 189 ft. bridge to carry Rte. 17E over new road, Steuben Co.

▲ **NEW YORK**—John W. Johnson, supt., Dpt. P. Wks., The Gov. Alfred E. Smith State Office Bldg., Albany, bids opened 8/8.

N. Y.—Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, N. Y., LB **$2,964,364.** Est. $3,-015,000 (1 bidder) 25 concrete piers and two concrete abutments for Canadian U. S. approach spans to main spans of the International Bridge to Johnstown, Ont., Canada, St. Lawrence Co.

N. Y.—Shanahan Construction Co., Inc., 109 Canal St., Ellenville, N. Y., LB **$736,514.** Est. $738,000 (2 bidders) 340 ft. long hinged steel arch bridge and approaches to carry Rte. 213 over Rondout Creek in Eddyville, Ulster Co. CD 7/11.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton,

Public Constructors, Inc., Browning Rd. and Kings Hy. Belmawr, N. J. LB **$3,527,356.** grading, paving and bridges 2.356 mi. Route 102, Section 2A, Route 28 from Clinton and Union Twps., Hunterdon Co. Bids July 2. CD 6/15.

BUILDINGS—LB & CA

▲† **U. S. Eng.**, 111 E. 16 St., New York, N. Y., received no bids July 11, Capehart permanent family HOUSING, ENG-30-075-57-8; and offsite utilities for Niagara AAA Defense Area, ENG-30-075-57-458, NEW YORK. Est. **$3,000,000-$4,000,000.** CD 6/21.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 23 Kentucky
STREETS AND ROADS
August 21 Virginia — August 22 Florida
August 23 Kentucky

BUILDINGS—LB & CA

▲ **J. F. Pritchard & Co.**, 4625 Roanoke Parkway, Kansas City, Mo., CA **$8,000,000.** design and construct EXTRACTION PLANT to recover heavier hydrocarbons from gas, KENOVA, W. VA. Columbia Gas System, 120 E. 41 St., New York, N. Y.

▲ **G. E. Bass & Co.**, Box 1033, Jackson, Miss., LB **$4,298,033**, low rent HOUSING, Ala. 2-4, MOBILE, ALA. Mobile Housing Bd., 1555 Eagle Dr., Mobile, Ala., bids July 30. CD 7/19.

▲ **J. F. Pritchard & Co.**, 4625 Roanoke Parkway, Kansas City, Mo., CA **$5,000,000.** design and construct, hydrocarbon fractionation PLANT with underground cavern storage, on Ohio River SILOAM, KY. Columbia Gas System, 120 E. 41 St., New York, N. Y.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 20 Indiana
STREETS AND ROADS
August 21 Michigan

BUILDINGS—BA

▲ **Mich., Detroit**—BANK—BA 8/30—National Bank of Detroit, 660 Woodward Ave., 12 story L-shaped bank, Griswold and Fort Sts. $10,000,000. Albert Kahn Associated Architects & Engineers Inc., 345 New Center Bldg., archt. CD 3/15/55.

HEAVY CONSTRUCTION—LB & CA

▲ **George D. Hardin**, 2130 S. Michigan Ave., Chicago, Ill., LB **$3,186,890**, plant equipment for Chicago's Central District filtration plant, CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids July 18. CD 7/1.

▲ **City**, City Hall, Chicago, Ill., rejected bids May 29, NW Expressway tri-level grade separation at Hubbard and Green Sts., CHICAGO, ILL. LB **$12,371,000.** CD 6/17.

BUILDINGS—LB & CA

▲ **United Eng. & Foundry Co.**, 948 Fort Duquesne Blvd., Pittsburgh, Pa., CA **$50,000,000**, 500,000 sq. ft. SLABBING MILL, EAST CHICAGO, IND. Inland Steel Co., 38 S. Dearborn St., Chicago, Ill. CD 11/11/55.

▲ **Alexander & Kingbay**, 4641 Hiawatha Ave., Minneapolis, Minn., CA **$4,000,000**, 1 story, 200,000 sq. ft., brick Tri-City SHOPPING PLAZA, 5 Ave. and Clark Road, GARY, IND., owner c/o Sidney H. Morris & Assocs., archts, 134 N. LaSalle St., Chicago, Ill.

▲ **Henning E. Johnson & Sons**, 7649 State St., Chicago, Ill., CA **$11,000,000**, 600 unit APARTMENT, 147 to 154 Sts. from Sunset to Harper, DOLTON, ILL. Meadow Lane Country Gardens, 7949 State St., Chicago, Ill., Fitch, Schiller & Frank, 23 E. Jackson Blvd., Chicago, Ill., archts.

▲ **Dravo Corp.**, Dravo Bldg., Pittsburgh, Pa., CA Est. **$35,000,000**, PLANT EXPANSION, incl. dock exten. ore storage, ore bridge, blast furnace, sintering plant, oxygen steel producing equipment, etc. TRENTON, MICH. McLouth Steel Corp., M. A. Cudlip, pres., Trenton, Mich. CD 7/3.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 20 Iowa — August 23 Minnesota, North Dakota
STREETS AND ROADS
August 20 Iowa — August 22 Kansas
August 23 Minnesota, North Dakota

BUILDINGS—BA

▲ **Tex., Mount Pleasant**—REFINERY—Bids asked—American Petroleum Co. of Texas (subsidiary of American Petrofina Inc.) c/o Mercantile Securities Bldg., Dallas, expansion of existing refinery to add a catalytic reformer, alkylation unit and related facilities. $3,400,000. CD 8/2.

HEAVY CONSTRUCTION—LB & CA

▲† **Robert E. McKee**, 221 Washington Ave., Santa Fe, N. M., LB **$5,103,700.** 3 story Cadet Social Center and Theater, IFB-05-613-057-43, Air Force Academy, COLORADO SPRINGS, COLO. Dpt. Air Force, P. O. Box 1670, Colorado Springs, Colo. Bids Aug. 6. CD 7/9.

BUILDINGS—LB & CA

▲ **Winn-Senter Constr. Co.**, 901 W. 43 St., Kansas City, Mo., CA Est. **$8,000,000.** (1) 2 story, penthouse 317,-980 cu. ft. OFFICE BLDG., (2) 2 story, 46,215 cu. ft. block OFFICE BLDG. (3) 36,860 cu. ft. EQUIPMENT GARAGE and (4) 158,334 sq. ft. FREIGHT HOUSE, KANSAS CITY, KAN. Union Pacific R.R. Co., 1416 Dodge St., Omaha, Neb. Bids July 17. CD 7/11.

▲ **Brown & Root, Inc.**, Box 3, Houston, Tex. CA **$4,500,000**, PAPER MILL EXPANSION, LUFKIN, TEX. Southland Paper Mills, Lufkin, Tex. CD 8/6.

▲† **J. W. Bateson Co., Inc.**, Box 13307, Walnut Hill Station, Dallas, Tex. CA **$7,397,600**, 500 Capehart Family HOUSING UNITS, Title VIII, Foster Air Force Base, ENG-41-656-57-60, VICTORIA, TEX. Purchasing & Contg. Office, Foster Air Force Base, Victoria, Tex. Bids June 20. CD 6/26, under LB, Airports.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
September 4 California
STREETS AND ROADS
August 28 California

BUILDINGS—BA

▲† **Calif., Fort Ord**—HOUSING—BA 9/5—Procurement Officer, Fort Ord, 900 units Capehart housing, ENG-48-4. $14,500,000. CD 2/18.

▲ **Nev., Las Vegas**—CONVENTION CENTER—BA 10/3—Clark County Fair & Recreation Bd., Court House, convention center. $4,500,000. Adrian Wilson & Assoc., 816 5 St., Los Angeles, Calif., archts. CD 7/18/56.

▲† **Calif., Palo Alto**—HOSPITAL—BA 10/22—Veterans Admin., Office of Director, Constr. Munitions Bldg., Wash., D. C., veterans hospital bldgs. and facilities 90 acre site, Spec. 5730. $20,000,000. Welton Becket, 5657 Wilshire Blvd., Los Angeles, archt., Robinson & Giddings, 80 Stonestown St., San Francisco, engrs. CD 2/1.

HEAVY CONSTRUCTION—LB & CA

▲ **Benson & Montin**, Republic Bldg., Oklahoma City, Okla., CA Est. **$3,750,000**, gas distribution sys. in Longview-Kelso, Woodland, Castle Rock, Monroe, Snohomish and Mount Vernon, WASHINGTON. Pacific Natural Gas Co., Longview, Wash. Porter, Barry & Assocs., Baton Rouge, La., engrs. CD 1/17/56.

BUILDINGS—LB & CA

▲† **George A. Fuller Co.**, 3100 West 8 St., Los Angeles, Calif., LB **$10,499,691** (9 bidders) 800 units Title VIII HOUSING Camp Cooke Air Force Base, LOMPOC, CALIF. Air Force Ballistic Missile Div., Air Research & Development Command, P. O. Box 262, Inglewood, Calif. Bids Aug. 6. CD 7/16.

▲ **Barrett Constr. Co.**, 1800 Evans Ave., San Francisco, Calif., LB **$3,817,000** (5 bidders) general contract 7 story, 400,000 sq. ft. rein.-con. STATE OFFICE BLDG., vicinity Golden Gate and Polk Sts., SAN FRANCISCO, CALIF. State Div. Architecture, P. Wks. Bldg., Sacramento, Calif. Bids Aug. 6. CD 7/22;
Patterson-Emerson-Comstock, Inc., 3427 Grand Ave., Oakland, Calif., LB **$787,878** (8 bidders) electrical work, (San Francisco, Calif.);
Anderson & Rowe, Inc., 2501 Harrison St., San Francisco, Calif., LB **$1,592,937** (11 bidders) mechanical work (San Francisco, Calif.).

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
August 21 Ontario
STREETS AND ROADS
August 20 British Columbia — August 21 Ontario

BUILDINGS—SLC

▲ **Ont., Toronto**—OFFICE SUBSTRUCTURE — Sun Life Assurance Co. of Canada, Victoria and Adelaide Sts., soon lets contract substructure 16 story and 6 bsmnt. office bldg. Richmond St. W. south side, between University Ave. and Simcoe St. Total est.. $7,000,000. John B. Parkin Associates, 1500 Don Milos Rd., Don Mills, Toronto, archt. J. J. C. Paine, Sun Life Bldg., Montreal, Que., consult. archt. CD 5/23/56.

AMERICANS ABROAD

BUILDINGS—LB & CA

▲ **United Eng. & Foundry Co.**, 948 Fort Duquesne Blvd., Pittsburgh, Pa., U. S. A., CA Est. **$10,000,-000.** reversing COLD MILL and reversing PLATE MILL at Hirohata Works, HIROHATA, JAPAN. Fuji Iron & Steel Co., Ltd., Hirohata, Japan. World Bank will finance;
The Wean Engineering Co., Inc., 347 N. Park Ave., Warren, O., U. S. A. CA annealing furnace for mill (Hiirohata, Japan).

(Proposal Advertisement see pp. 182 to 184)

Steeltex eliminates costly pre-construction engineering required by other centering materials. It gives clean, dependable reinforcing form in any lengths needed regardless of variation in joist spacing. Steeltex is light, easy to handle.

Steeltex speeds college construction

Contractors tell of money-saving advantages gained from Pittsburgh Steel's floor lath on Purdue and University of Kentucky jobs

The critical need for new school buildings to handle our expanding population is also acute on college campuses.

At Purdue University and University of Kentucky, where married veterans and their families are crowding housing facilities, big construction programs are underway. At both universities, Steeltex wire mesh reinforcing floor lath was specified by architects because it helps achieve the most value for each construction dollar.

Purdue is engaged in a $9½ million project to house married students in a unique 58-building development located on a 30-acre site at the edge of the West Lafayette, Indiana, campus.

In Lexington the University of Kentucky is building the $2 million Shawneetown married students and faculty housing project on a 10-acre site adjacent to the campus to provide 186 apartments for married students and faculty members.

In Indiana, since economy of construction was an important factor to university authorities, Architect John R. Diehl of Fairless Hills, Pennsylvania, specified Pittsburgh Steel Products' Steeltex, the reinforcing that carries its waterproofed form right on its back.

The 370,000 square feet of Steeltex, used to cover joists on the first and second floors of the units, will return substantial savings in time and money while assuring durable concrete floors.

John W. Galbreath & Co., Columbus, Ohio, teamed with Turner Construction Co. of New York City to form Galbreath-Turner, general contractors for the construction.

Earl Wooten, superintendent for Carl Vestal, Inc., Indianapolis, sub-contractor who installed the Steeltex, gave this estimate of the time saved by using Steeltex to cover 370,000 square feet of floors.

"If we had used another material, each of these 58 buildings would take six days and require 20 men's services. With Steeltex, however, we needed only one and one-half days and the services of five men for each building."

Similar commendation came from the Kentucky project where Ben Landin, general superintendent for the Hargett Construction Co., of Lexington, said:

"I like Steeltex because of the installation speed. If we had to use a reinforcing material that required wooden forms, it would call for a heavier slab—about four inches thick. But with Steeltex, we need only a 2¾-inch slab which gives us lighter-weight construction.

"Another advantage is that Steeltex provides lateral stability for the joists. A stronger structure is the result.

"I believe that Steeltex is far superior to any other type of material for fitting around irregular-shaped objects quickly and snugly. We don't waste as much concrete and we complete the job faster."

And Lewis H. Hargett, president of the contracting firm, cited these Steeltex advantages: "It's economical, it's convenient to install and the men on the job don't need any special training to install it."

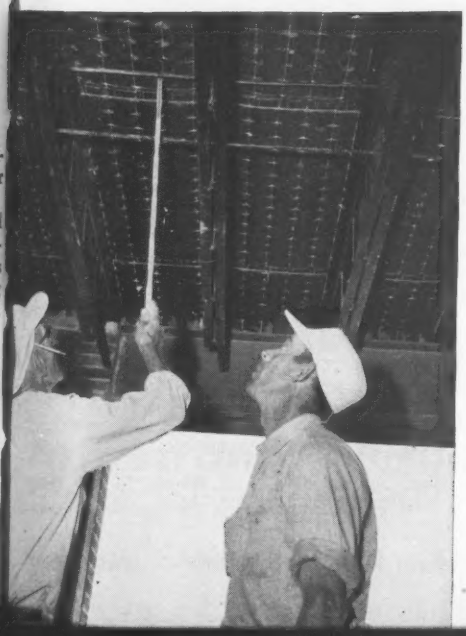
He added, "In recent years, we've used several hundred thousand square feet of Steeltex and found it completely satisfactory. After checking the cost of Steeltex over other materials, we find there is a definite saving per square foot in using Steeltex."

These same advantages can work for you when you use Steeltex, sold by the Pittsburgh Steel Products Division of Pittsburgh Steel Co. Start pocketing these savings now. You can do that by picking up your telephone now and getting in touch with one of the trained engineers waiting to help you in each of the district offices listed below. Do it today.

Pittsburgh Steeltex is installed faster than alternate materials. Here it's being installed at the University of Kentucky's housing project.

Steeltex fits around irregular piping, vents and projections. Easy to cut, it speeds construction and saves money.

Superintendent Ben Landin (left) of Hargett Construction Co. points to clean, neat appearance of Steeltex under concrete slab to Superintendent Jim League, Whalen Erecting Co. which installed Steeltex.



Steeltex®

Pittsburgh Steel Products

a division of **Pittsburgh Steel Company**

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Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
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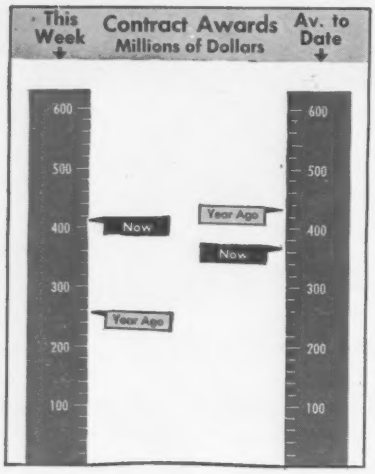
Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 33 wks 1957 millions	Chge '56-'57 %
Federal	$27.4	$1,737.9	+5.0
State and Municipal	154.7	4,774.7	+16
Total Public	182.1	6,512.6	+24
Total Private	229.8	5,633.2	−36
U. S. Total	$411.9	$12,145.8	−14
By Type of Work			
Waterworks	$5.4	$235.0	+1
Sewerage	6.6	360.7	−5
Bridges	8.1	471.6	+23
Highways	83.0	2,059.9	+34
Earthwork, Waterways	5.8	684.0	+38
Buildings:			
Public, Excl. Housg.	41.2	1,454.5	+13
Public Housing	16.8	448.7	+107
Private Housing	46.0	1,952.3	−46
Commercial	30.8	1,153.1	−2
Industrial	146.7	2,210.5	−38
Unclassified	21.5	1,115.5	−3
U. S. Total	$411.9	$12,145.8	−14

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

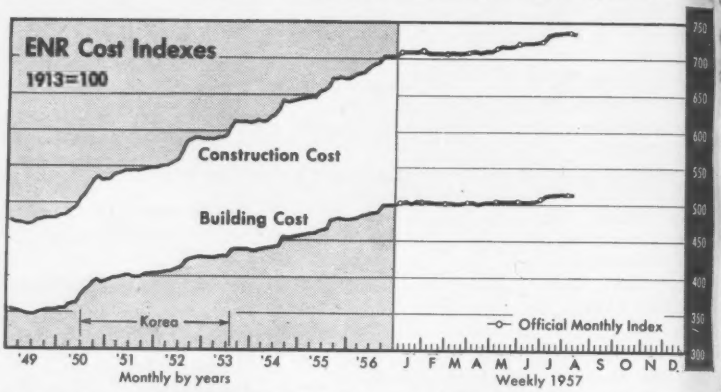
NEW CAPITAL FOR CONSTRUCTION

	Week of Aug. 8	Cum. 32 wks 1957 millions	Chge '56-'57 %
Corporate Securities	$21.5	$3,651.4	+25
State and Municipal:			
All Except Housing	81.1	3,297.3	+11
Housing	...	155.8	+268
Federal Loans	1.1	155.2	+26
Federal Aid	...	2,161.2	+102
Total Nonfederal	$103.7	$9,420.9	+32
Federal Appropriations:			
In U. S.	...	$413.8	−88
Outside U. S.	...	22.8	+43
Total New Capital	$103.7	$9,857.5	−7

Cost Indexes as of Now

ENR INDEXES (1913=100), 20-cities' average	Week of Aug. 8 1957	% Change from July 11 1957	% Change from Aug 9 1956
Construction Cost	738.46	+0.4	+4.5
Building Cost	516.80	+0.3	+3.1

To convert above indexes to 1926=100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949=100: Divide Construction Cost by 4.770; Building Cost by 3.518



CONTRACTS AWARDED

	1957 July (millions)	1957 7-Mos. (millions)	% Change from 1956 July	% Change from 1956 6-Mos.
Total U. S., ENR reported	$1,589.1	$11,034.6	−13	−16
Private	637.2	5,049.8	−42	−39
Public	951.9	5,984.8	+30	+22
State and Municipal	677.4	4,328.5	+29	+1
Federal	274.5	1,656.3	+33	+56
ENR Volume Index, 1913=100	587	556	−21	−22

NEW CONSTRUCTION CAPITAL

Total U. S.	$1,304.9	$9,550.7	−26	+22
State and Municipal Bond Sales	318.5	3,284.3	+16	+15
Corporate Security Sales	365.8	3,518.0	−18	+31
Federal Loans, Aid (nonfederal work)	230.1	2,311.7	+39	+101
Federal Appropriations (federal work)	390.4*	436.6*	−55	−62

* Includes funds for outside U. S.

MATERIALS SHIPMENTS

Unit	1957 April (A) May (My) June (J)	Cum. (No. of Mos.)	Percent Change from Year Ago Mo.	Cum.
Portland Cement, Bureau Mines, thous bbls	23,125(A)	70,597(4)	−15	−10
Concrete Paving Awards, PCA, thous sq yd	11,086(J)	52,647(6)	+44	+11
Fabricated Structural Steel, thous tons	329(J)	1,818(6)	+16	+5
Bookings, AISC, thous tons	220(J)	1,725(6)	−35	−21
Reinforcing Bars, Net, AISI, thous tons	188(My)	1,103(5)	−18	+7
Lumber, NLMA, mil fbm	3,119(My)	14,011(5)	− 8	−11
Orders, mil fbm	3,179(My)	14,278(5)	+ 1	− 9
Production, mil fbm	3,050(My)	14,139(5)	−11	− 9
Douglas Fir Plywood, DFPA, 3/8" basis				
Production (aver per week), mil sq ft	116.7(J)	104.3(6)	+32	+ 4
Orders (average per week), mil sq ft	103.8(J)	103.4(6)	+ 8	+11
Clay Products, Bureau of Census				
Brick, Unglazed, Common, Face, mil bri	523.1(A)	1,662.6(4)	−16	−19
Vitrified Clay Sewer Pipe, thous tons	139.4(A)	492.3(4)	+ 9	−13
Structural Tile, Unglazed, thous tons	47.7(A)	190.3(4)	−19	−13
Asphalt Products, Bureau of Census				
Asphalt Roofing, thous sales sqs	3,954(My)	19,783(5)	−26	−13
Asphalt Siding, thous sales sqs	66(My)	415(5)	−14	− 7
Aluminum, Wrought, Net, Bureau Census				
Sheet and Plate (non-heat treatable), mil lbs	89.9(My)	406.2(5)	−11	−19
Wire and Cable, mil lbs	22.7(My)	118.8(5)	−20	−12
Extruded Shapes (Soft alloys), mil lbs	59.5(My)	254.0(5)	+10	− 7

EMPLOYMENT AND FAILURES

Contract Const Employment, BLS, thous	3,210(J)	2,882(6)**	− 1	−11
Contractor Failures, Dun & Bradstreet				
Number	164(J)	1,079(6)	+ 1	+25
Liabilities, thous	$10,066(J)	$59,512(6)	+17	+25

** Average per month

Exclusive Full Random pattern of Armstrong Acoustical Formboard brings new beauty to poured-in-place roof deck construction.

New Armstrong T&G Acoustical Formboard eliminates need for reinforcing cross tees or splines

You can guarantee maximum economy and attractiveness on your poured-in-place roof deck jobs by specifying Armstrong Acoustical Formboard.

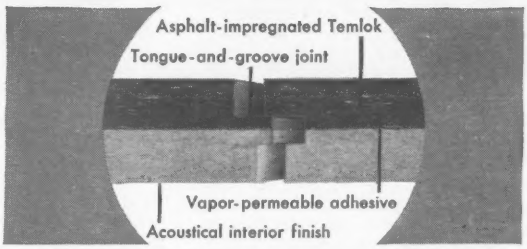
T&G joints on Acoustical Formboard are entirely self-supporting and need no reinforcement from main purlins, supplemental splines, or cross (joint) tees. This eliminates the cost of these extra reinforcing materials as well as the time and expense of installing them. What's more, a ceiling of Armstrong Acoustical Formboard presents an attractive, monolithic appearance, unbroken by the conspicuous markings of cross tees.

Perforated in an exclusive Full Random pattern, the interior surface provides a smart, decorative ceiling which is also highly efficient acoustically. Finished with two coats of factory-applied white paint, Acoustical Formboard has a light reflectance of 78% and a certified "C" of 0.36 btu at 75° F. mean temperature. It is available in both 24" x 48" x 1" and 32" x 24" x 1" sizes.

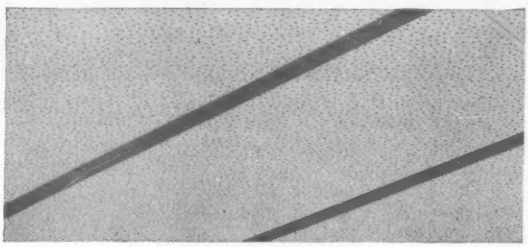
For a free booklet that tells you all about Armstrong T&G Acoustical Formboard, write to Armstrong Cork Company, 3808 Wallace Street, Lancaster, Pennsylvania.

Armstrong FORMBOARDS

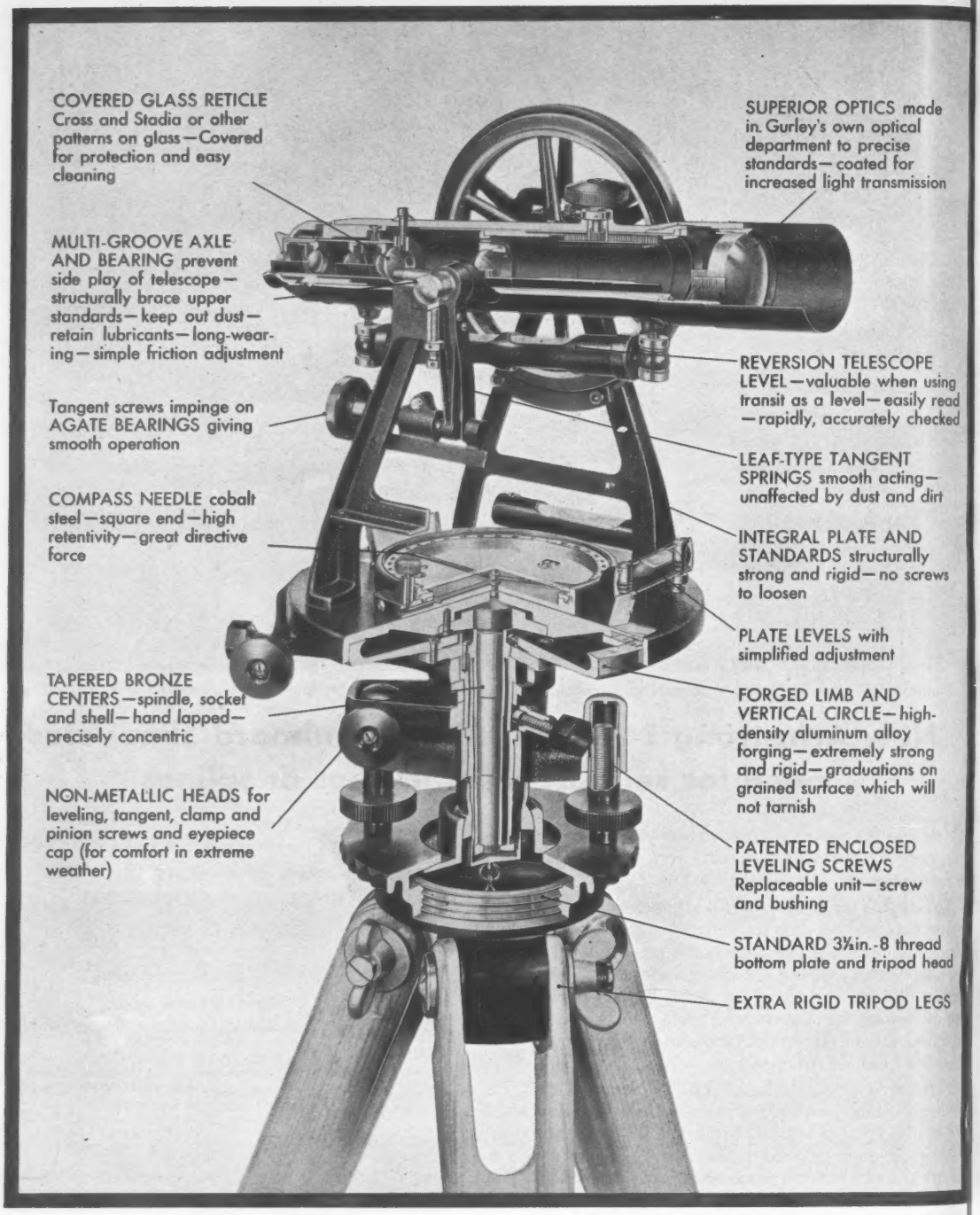
Acoustical Formboard Insulation Formboard (T&G or Cut-to-Length)



High strength of Armstrong Acoustical Formboard results from two-layer lamination. Vapor permeable fiberboard and laminating adhesive allow free escape of moisture for slab curing. Special adhesive retains its strength when wet.



Narrow bevels on Armstrong Acoustical Formboard give ceilings exceptionally clean appearance. Extra strong T&G joints will adequately support weight of roof deck.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STANDARD 3⅛in.-8 thread bottom plate and tripod head
EXTRA RIGID TRIPOD LEGS

The Gurley Precise Transit

W. & L. E. Gurley, Troy, N. Y.

GURLEY

Machinery Prices Going Up

Manufacturers plan price increases by fall to offset rising costs, lower profit margins in first half of '57

Caught in a squeeze that trimmed profit margins in the first six months, manufacturers of construction machinery and equipment plan price increases ranging from 2% to 6% in the next few months, an ENGINEERING NEWS-RECORD survey shows. For contractors, higher machinery prices obviously will mean still another addition to costs. For the manufacturers, the high price tags will come in the wake of a continued downturn in new orders.

A few price increases already have been posted by Caterpillar Tractor, American Brake Shoe, Blaw-Knox and Browning Manufacturing. Two others, Hyster and Clark Equipment, are expected to increase their prices in the immediate future.

By October, prices generally will be up from 2% to 6% on many lines of construction machinery and equipment, according to the ENGINEERING NEWS-RECORD survey.

- Of 46 manufacturers checked by ENR, 25 reported they will raise prices between now and Dec. 31.
- Three firms may increase prices later in the year but have no plans for an immediate boost.
- Fourteen do not intend to hike their prices any more this year—but, five of these raised prices this year.
- Two firms are undecided, apparently awaiting further cost studies.
- And two manufacturers are running counter to the trend. They plan to cut prices, at least on some lines.

One company, a tractor manufacturer, is studying a price cut because of "buyer resistance to spiraling prices." The other, a manufacturer of crushing and asphalt plants, expects to trim prices on some lines 5%—before November—because of economies stemming from redesign. However, this firm will boost prices on other lines 5% to 7%.

• **Stable period ending**—The anticipated wave of price boosts for construction machinery during the current half year will end a period of price stability that marked the first six months.

In the January-June period, prices advanced 1.1%, according to the Bureau of Labor Statistics Wholesale Price Index for Construction Machinery. This was less than the 2.6% rise in the index during the first six months of last year and contrasted sharply with the 6.2% climb tallied during the second half of last year.

But, despite the stability noted in the first half of 1957, the forthcoming round of price increases will place a heavy burden on contractors, considering that prices paid for equipment in the "stable period" were 7.4% greater than those for the first half of 1956.

• **Current boost**—Five companies announced price increases last month. They were:

- Caterpillar Tractor Co., 7% on all its machinery.
- American Brake Shoe Co, 7½% (shovel buckets).
- Blaw-Knox, 7½%.
- Browning Manufacturing, 6% (rollers), 4% (crushers).
- Seaman-Andwall Division, American Marietta, 5% to 6%.

This month, Clark Equipment raised prices on its tractor shovels. Hyster Co. expects to boost prices by 5%, while a manufacturer of bucket loaders and clamshell buckets expects to push prices up by 8%.

These announcements will be followed by others before August ends.

At least three lines of graders, two makes of rollers, one line of two- and four-wheeled tractor-scrapers, and one line of clamshell buckets and bucket loaders will carry new, higher price tags.

One manufacturer of rollers and motor graders plans a 6% to 10% increase. A competing motor grader concern looks to a 6% to 8% increase on its line. The wheeled tractor-scraper line will see boosts of approximately 6% and clamshell buckets and loader line will jump about 6%.

• **More later**—August price announcements will not be the last word on the subject. More firms will join the parade before year-end. Three of the larger power shovel manufacturers expect to raise prices, from 2% to 5%.

One company plans a 3% increase in September. A second company will follow through in the fourth quarter with a 5% boost, while the third manufacturer will ticket its product 2% to 3% higher before Dec. 31.

In contrast to the imminent flurry of power shovel price increases, at least one smaller manufacturer will hold the price line for the remainder of the year.

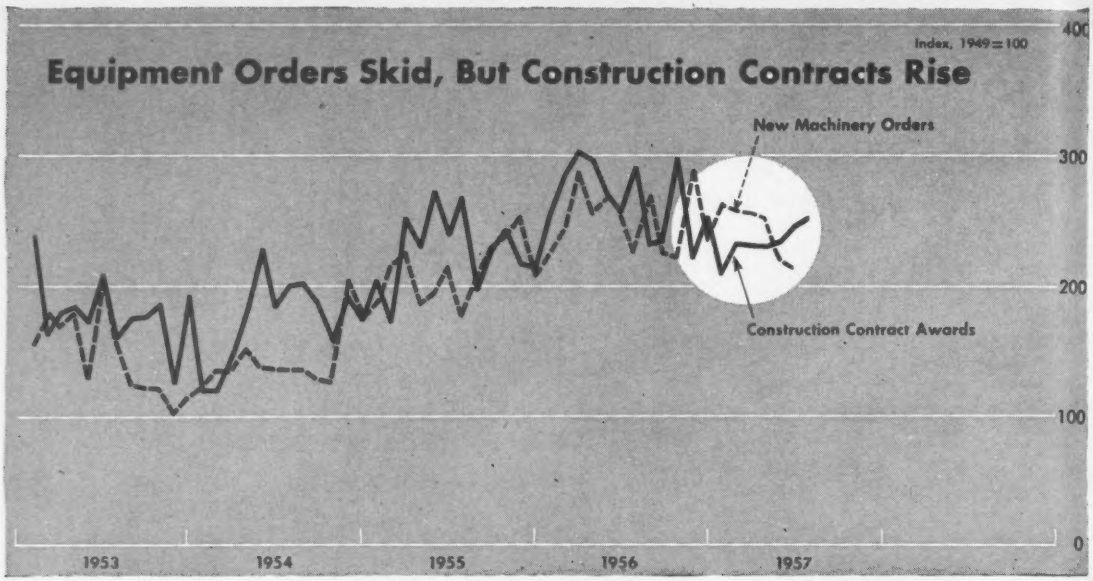
Two lines of off-highway trucks are scheduled for higher prices soon. A third producer has enough chassis on hand to hold off a price boost, at least until November.

Of the two off-highway truck manufacturers planning price increases, one expects its markup to be 3% to 5%, effective in October. The second firm could not pinpoint the increase or the approximate date.

The firm that plans to hold off price increase reported a large supply of

NET SALES AND PROFITS IN EARTHMOVING MACHINERY

COMPANY	6 MOS. ENDING	SALES (in thousands) 1956	SALES (in thousands) 1957	PROFITS (in thousands) 1956	PROFITS (in thousands) 1957	PROFIT MARGINS (percentages) 1956	PROFIT MARGINS (percentages) 1957
Allis-Chalmers	June 30	294,265	285,832	11,856	11,292	4.0	4.0
American Hoist	May 26	15,571	18,346	691	966	4.4	5.3
Baldwin-Lima-Hamilton	June 30	100,248	97,891	1,581	3,237*	1.6	3.3
Blaw Knox	June 30	78,373	89,046	3,558	3,701	4.5	4.2
Bucyrus-Erie	June 30	45,248	50,282	4,116	3,306	9.1	6.6
Caterpillar Tractor	June 30	346,664	372,049	27,381	27,389	7.9	7.4
Chain Belt	April 30	28,101	30,380	2,336	2,344	8.3	7.7
Clark Equipment	June 30	75,732	73,998	4,596	4,322	6.1	5.8
Gardner-Denver	June 30	30,518	35,287	3,401	4,002	11.1	11.3
Harnischfeger	April 30	37,346	42,484	1,319	1,861	3.5	4.4
International Harvester	April 30	609,396	553,115	24,459	19,495	4.0	3.5
Koehring	May 31	25,517	30,668	1,280	1,542	5.0	5.0
Westinghouse Air Brake	June 30	113,064	123,794	6,136	6,641	5.4	5.4



chassis on hand. In addition two of its suppliers—bodies, trailer dump bodies and hoists will hold their price lines for the remainder of 1957.

• **Tractor price variations**—Two of four makers of crawler tractors, in addition to Caterpillar whose prices already have been boosted, will bump their prices upwards before the end of this year.

A third tractor company has not planned a price change but it believes a price rise is likely. The fourth company may reduce its prices because "spiraling prices" have created buyers' resistance among some heavy construction and mining industry customers.

Two major diesel engine makers are not considering price increases before the end of the current year. One of these, Cummins Engine Co., has not increased prices since 1953. The other firm expressed uncertainty as to its future price structure during the remainder of the year.

However, prices of concrete mixers (both stationary and truck types), will move up, according to three companies. One manufacturer plans selective increases from 1% to 8%. The second probably will boost its prices 5% to 6% in October.

• **Other equipment**—Among other price increases coming are those for crushing plants and asphalt plants. One manufacturer anticipates a November increase of 5% to 7% for certain items.

The same company, however, will lower prices this month on some of its items. The action will stem from redesign economies.

At least one manufacturer of ditching and trenching machines will boost prices 4% to 5% before the end of the year.

Three machinery manufacturers report no price changes are planned, but they have left the door open for a later advance. The Gradall Division of Warner & Swasey, for example, said that a price increase may come later this year—depending on the results of its current cost reduction program. A manufacturer of road rollers said higher prices may be posted if its suppliers increase prices. A third firm, a bucket manufacturer, reports a price boost is possible after Oct. 30.

• **Cost-profit squeeze**—Erosion of profit margins in the construction machinery industry was readily apparent during the first half. Several manufacturers reported that sales ran ahead of last year's first six months. However, profit margins thinned out slightly (see table).

Of 13 firms whose earnings are reported, nine show sales up over 1956. First half increases ranged from 7.3% for Caterpillar Tractor Co. to 20% for Koehring (six months ending May 26).

Small declines of 2% to 3% were reported by Baldwin-Lima-Hamilton, Clark Equipment and Allis-Chalmers. International Harvester, however, reported a 9% sales decline.

Net profits were higher for all firms reporting a sales increase with the exception of Bucyrus-Erie. Profit margins increased for only three of these companies, while six reported a profit margin dip.

Baldwin-Lima-Hamilton was an extreme exception. Its first half sales were down, but its net profits and profit margin both more than doubled.

Bucyrus-Erie said its lower earnings resulted from several factors, including large shipments of newly developed machines that have not "reached a normal cost of manufacture," expenses of starting up a new Canadian plant, and capital improvements.

• **Brighter future**—Despite a continued slump in new orders for construction machinery during June (see chart), there are some factors favoring an improved outlook.

According to the McGraw-Hill Department of Economics New Orders Index, the June rate of decline was slight—3%—when compared with the sharp drops in April and May. June orders were 20% under March's high for the year to date. The drop in equipment orders—12% under ayear ago—reflects the drop in heavy construction contracts. Such contracts were 17% under last year's record first half, according to ENR figures. Significantly, machinery orders fell below a year ago by 18% in May and 17% in June.

But a rising volume of new business may cause contractors to increase their purchases of new machines in this year's second half. Should the recovery in total heavy construction contract awards gain strength, machinery manufacturers may expect a repeat performance of the 1954 sales trend when a sharp recovery in machinery orders came late in the year after a brisk upturn in contracts during the second quarter.

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Profits Dip for Materials Suppliers

NET SALES AND PROFITS: MATERIALS AND INSTALLED EQUIPMENT SUPPLIERS

COMPANY	6-MOS. ENDING	SALES (in thousands) 1956	SALES (in thousands) 1957	PROFITS (in thousands) 1956	PROFITS (in thousands) 1957	PROFIT MARGINS (percentages) 1956	PROFIT MARGINS (percentages) 1957
CEMENT							
Alpha Portland	June 30	15,598	15,801	3,057*	2,262	19.6	14.3
General Portland	June 30	22,446	20,906	4,905	4,106	21.9	19.6
Ideal	June 30	36,014	34,236	6,862	5,487	19.1	16.0
Lehigh Portland	June 30	34,748	33,909	5,024	4,154	14.5	12.3
Lone Star	June 30	47,133	48,993	7,450	7,279	15.8	14.9
Marquette	June 30	19,525	19,452	3,189	2,622	16.3	13.5
Penn-Dixie	June 30	21,630	17,390	3,593	1,630	16.6	9.4
LUMBER							
Georgia Pacific	June 30	45,808	73,523	35,569	4,243	7.8	5.8
Harbor Plywood	March 31[1]	21,914	20,037	1,249	604	5.7	3.0
U. S. Plywood	April 30[1]	202,832	201,878	11,277	8,247	5.6	4.1
Weyerhaeuser Timber	June 30	222,600*	210,959*	31,993	28,146	14.4	13.3
WALL BOARD ROOFING							
Celotex	April 30	36,335	30,767	2,696	1,596	7.4	5.2
Certain-Teed	June 30	46,157	38,780	916	787	2.1	2.0
Flintkote	June 30	50,373	53,830	2,156	2,528	4.3	4.7
Johns-Manville	June 30	147,359	148,072	12,005	8,614	8.2	5.8
National Gypsum	June 30	81,395	69,891	8,935	6,220	11.1	8.9
Ruberoid	June 30	37,392	37,233	1,673	1,904	4.5	5.1
U. S. Gypsum	June 30	137,341	120,511	20,757	18,792	15.1	15.6
GLASS							
Libbey-Owens Ford	June 30	135,247	118,733	15,085	14,280	11.2	12.0
Pittsburgh Plate	June 30	292,519	311,097	30,258	29,239	10.3	9.4
AIR CONDITIONING—HEATING							
Carrier Corp.	April 30	83,536	103,454	2,966	2,739	3.6	2.7
Minneapolis-Honeywell	June 30	124,843	158,128	9,560	10,305	7.7	6.5
Trane Co.	June 30	36,850	39,762	2,574	2,641	7.1	6.6
Walworth	June 30	41,017	46,862	2,242	2,446	5.5	5.2
STEEL AND OTHER METALS							
Bethlehem	June 30	1,269,910	1,363,335	95,262	103,701	7.5	7.6
Inland	June 30	391,003	404,561	28,961	29,765	7.4	7.4
Jones and Laughlin	June 30	408,690*	432,358*	30,909	26,593	7.6	6.2
U. S. Steel	June 30	2,269,290	2,336,799	208,550	231,421	9.2	9.9
Aluminum Co.	June 30	443,202	423,260	48,615	38,039	11.1	9.1
Kaiser Alum. & Chem.	June 30	176,316	196,646	24,881**	15,697	14.1	8.1
Kennecott Copper	June 30	321,865	260,452	89,119	49,331	21.7	18.9
Reynolds Metals	June 30	212,562	216,922	25,015***	18,547	11.8	8.6
MISCELLANEOUS							
American-Marietta	May 31	85,951	96,070	5,745	6,332	6.7	6.6
National Lead	June 30	289,234	281,790	28,999	30,116	10.0	10.7
H. K. Porter	June 30	69,249	78,188	3,992	3,460	5.8	4.4

1.—Year ending
* Incl. other income
* Incl. $528,439 net credit adjt. applic. to pr. yrs.
* Incl. Oper. Rev.
** Incl. nonrecurring tax adjustment credit
*** Incl. nonrecurring profit

The sharp drop in housing volume during this year's first half and a highly competitive market accompanying the decline, struck hard at building materials manufacturers.

Of 35 companies sampled by ENGINEERING NEWS-RECORD, 16 reported a drop in sales volume during the first six months. However, 24 companies, including some who had increased sales, showed a drop in net profits. In 27 cases, profit margins were whittled. Only seven companies managed to increase their profit margins, while one company in the ENR survey maintained its previous margin.

Shrinkage in profit margins was consistent in three groups: cement, lumber and air conditioning-heating.

Seven major cement companies (see table) showed profit margin drops ranging from 5.7% to 43.3%. The lumber firms tabulated also registered profit margin declines, ranging from 7.6% to 47.4%. The heating-air conditioning group saw declines of 5½% to 25%.

• **Strike, weather hurts**—The cement group, hurt by the first half construction volume decline of 16%, also received a setback from adverse weather conditions that cut shipments in the first quarter and strikes in a few mills in the second quarter. The latter came at a time when shipments ordinarily would have picked up.

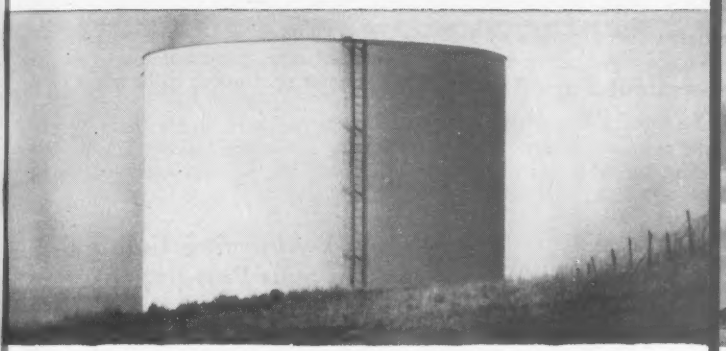
Depressed prices and slackening demand took their toll in the lumber category, particularly in the profit margin column. Net earnings in this field generally were down, although two companies did succeed in boosting sales volume.

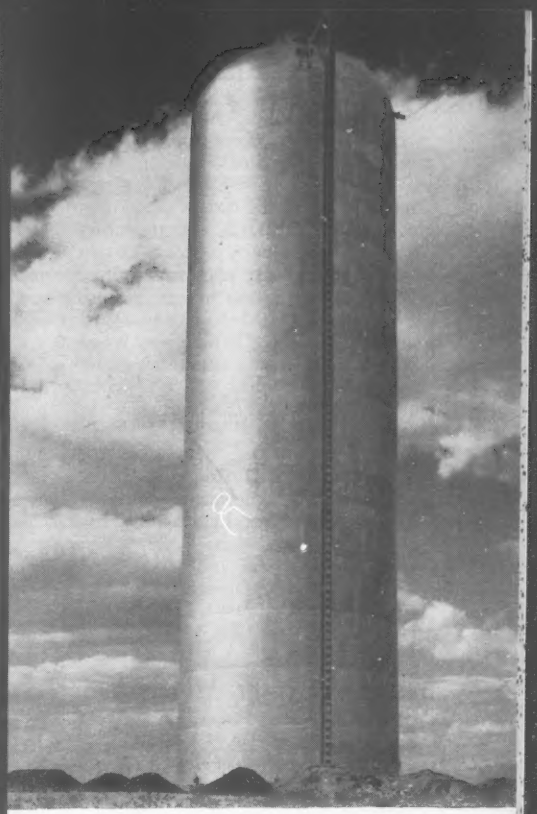
• **Home improvement helped**—In the wallboard and roofing sector, at least three companies were aided by the thriving volume of home improvement business. Ruberoid boosted its profit margin 13.3% in the face of a small sales decline. Flintkote upped profit margins by 9.3% aided by increased sales volume and net earnings improvement. U. S. Gypsum pushed its margin upward 3.3%.

Four concerns in this group had profit margin declines ranging from a low of 4.8% to a high of 29.7%.

• **Steel and metals**—Showing some of the widest swings in both directions were the steel, copper and aluminum companies.

(*Continued on page 176*)





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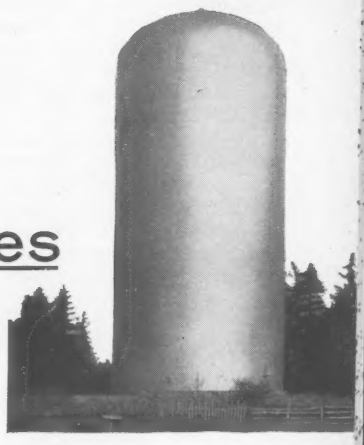

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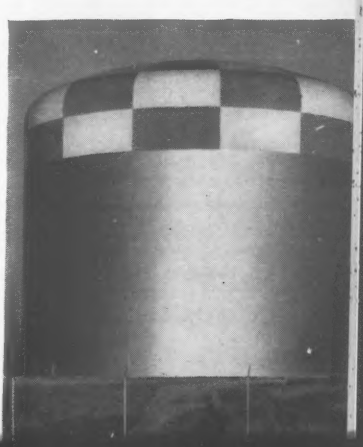

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PDM
RESERVOIRS

In the steel-metals group, represented by eight firms, five concerns registered profit margin declines ranging from 18% to 42.6%. But in the area as a whole, two companies scored profit margin gains—one of 1.3% and the other 7.6%. One company's profit margin equalled that of last years first half.

The greatest profit margin slumps were suffered by the copper and aluminum industry, with margins of two of three companies dropping despite increased sales volume. All three companies, however, had sharp drops in net earnings.

The three steel companies in the group—Bethlehem, Inland and U. S. Steel were most successfull, showing higher sales volume, higher net earnings and, in two cases, better profit margins. Bethelehem and U. S. Steel widened their profit margins while Inland maintained its first half margin on a par with last year.

Money Costs More

Federal Reserve hikes discount rate 7th time; fear of inflation is cited

The Federal Reserve Board last week tightened the screws still more on its two-year-old tight money policy, approving an increase in the discount rate, from 3% to 3½%, in four regional Federal Reserve Banks—Chicago, Philadelphia, Minneapolis and Kansas City.

Inflationary forces still dominate the economy, according to the Federal Reserve, and the latest hike in the discount rate, the seventh such increase since April 1955, is another attempt to curb excessive borrowing by the commercial banks.

(The discount rate is the price regional banks charge when they lend money to commercial banks that are members of the Federal Reserve System. The commercial banks, in turn, lend these funds to business and to private borrowers.)

The increase in the Fed's discount rate was strongly influenced by Bankers Trust, of New York, which last week upped the interest rates on loans to prime risks from 4% to 4½%. The Bankers Trust move was followed quickly by other banks.

The Fed then became alarmed over the gap between the price the banks pay to borrow money from the Fed (the discount rate) and the price the banks charge when they make their loans to industry, individuals and municipalities. For the Fed, the hike in the discount rate seemed merely to be closing the gap. But, in so doing, the Federal Reserve made it clear that at least for the immediate future, it wants banks to curb lending still further, thereby making money more expensive and loans more difficult to obtain.

The Fed's action comes at a time when high interest rates in the tax-exempt bond market are forcing some municipalities to defer financing, thus postponing construction projects.

Latest such "casualty" is a multimillion dollar auditorium-music center in downtown Los Angeles, Calif. It's been postponed indefinitely because of increased building costs and rising financing costs. Estimates of the interest rate needed to sell the bonds run up to 5%, as against earlier estimates of 3½%.

Connecticut Pays 3.6097% On Newest Pike Bond Issue

A $35 million Connecticut Turnpike bond issue, backed by the full faith and credit of the state, was sold last week at an interest cost of 3.6097%.

The sale brings to $285 million the total bonds sold to finance the facility. The previous $250 million in bonds are backed by toll revenues, the state's gasoline tax and some other motor vehicle revenues.

Without the full faith and credit provision for the new issue (ENR Aug. 1, p. 17), State Treasurer John Ottaviano said it was possible the new issue would have had a 4½% interest rate.

Steel Prices Under Fire By Senate Committee

The Kefauver antitrust "administered price" hearings opened a new phase last week, as the steel industry began its explanations of the recent price hike in steel. U. S. Steel Corp., which initiated the price rise, led off the parade of steel companies that will include some if not all of the top ten steel producers.

Senator Kefauver's plan is to make an industry-by-industry inquiry into how prices are set and what makes them change. The inquiry could last all summer and into next year. Early estimates were that U. S. Steel would be on the griddle for about a week. It now appears it will be much longer before any of the other steel companies are called.

The theory behind the inquiry is that big companies in concentrated industries—such as steel—can raise prices arbitrarily, which are then followed by all other companies in the industry. Senator Kefauver intends to find out whether prices are "administered"—or set—in this way, and if so, whether existing antitrust laws are broad enough to prevent such practices.

Dam Contractor Files Claim of $1 Million Against City

The Mayfield hydroelectric project at Tacoma, Wash., stalled completely since last fall as the result of a State Supreme Court decision, is besetting the city with additional troubles.

The general contractor, L. E. Dixon-Arundel Corp., has filed a damage claim of approximately $1 million against Tacoma. Although the firm is receiving $26,000 monthly in standby payments from the city, it is unwilling to tie up equipment indefinitely on the project, according to the city's projects manager.

The firm is now negotiating with department representatives on the amount of damages to be asked of the City Council.

The contracting firm holds a $10.8 million contract for the Cowlitz River facility being constructed for Tacoma City Light.

S.C. Approves Bonds For State Port Improvement

Acting within a few days of the resignation of three members of the State Port Planning Committee, the South Carolina State Budget and Control Board has approved a $6 million bond issue for improving two of the state's seaports.

The action came a few days after three members of the committee resigned in what they said was a protest over the failure to employ a general manager. The three members who quit are John K. Cauthen of Columbia; E. Hugh Agnew of Starr, and Charles E. Daniel of Greenville.

The new bond issue will be used to finance work at Georgetown and Port Royal. Another $15 million will be spent later at Charleston.

Business Briefs . . .

• **Aluminum prices up**—The Big Three of the aluminum industry, Alcoa, Kaiser and Reynolds, have raised ingot aluminum prices by one cent a pound and have hiked the price of mill products by about 4%. Ingot price of aluminum now is $520 a ton.

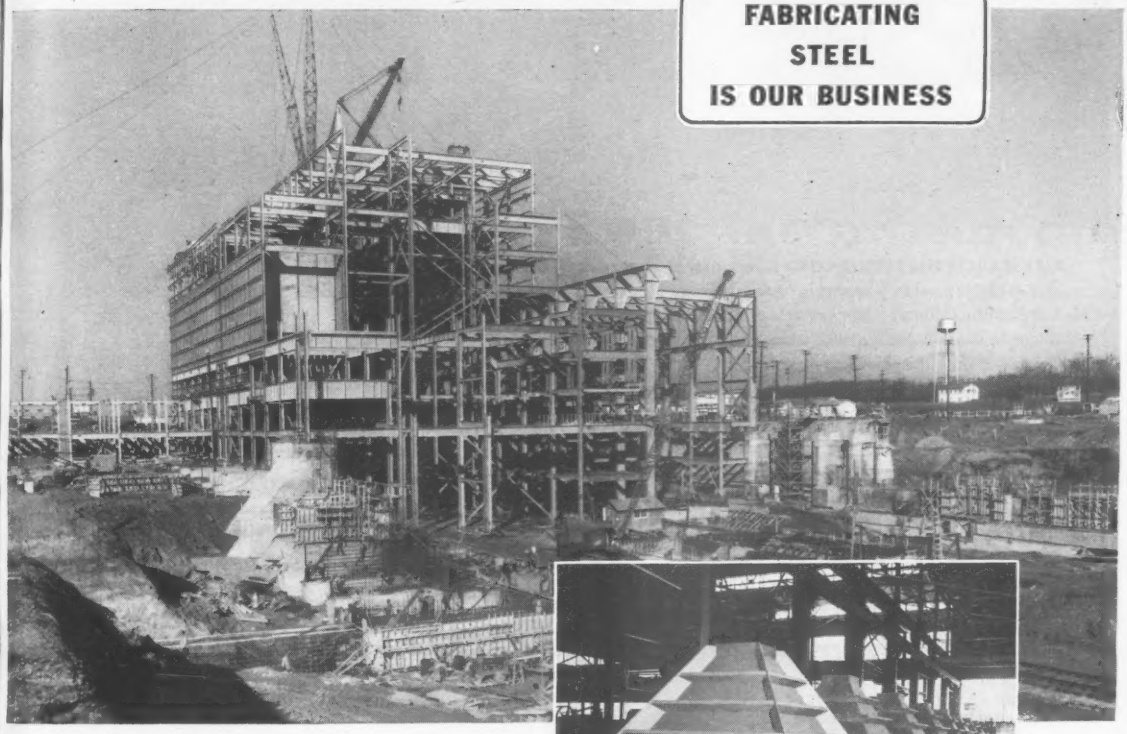
• **Money for construction**—Corporate security sales for construction set a new January through June record of $3.63 billion, up 32% over the same period in 1956, according to ENGINEERING NEWS-RECORD's own series on flow of construction money. And, the ENR series also shows that sales of state and municipal bonds are running 10% ahead of 1956, with a seven month total of $3.2 billion.

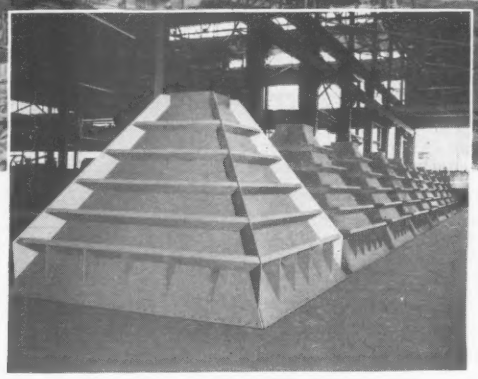
INGALLS steel service
. . . a package for power

Structural steel for all ten units of the TVA plant at Johnsonville, Tennessee, will be fabricated by The Ingalls Iron Works Company. Shown here are the first four units. Units 5 and 6 have since been completed and Ingalls is now fabricating the steel for the new units 7, 8, 9 and 10. Its division, Birmingham Tank Company, fabricated the coal hoppers (inset) for this steam plant and will do likewise for the new units.

Ingalls, the nation's largest independent steel fabricator, has served 46 of the nation's leading power companies in 22 states. In many instances the Ingalls Plants have worked together as a team or, working separately, have furnished either the fabricated steel, plate work, or erection. If you are contemplating a new structure, call on Ingalls—for 47 years fabricators of steel.

FABRICATING STEEL IS OUR BUSINESS





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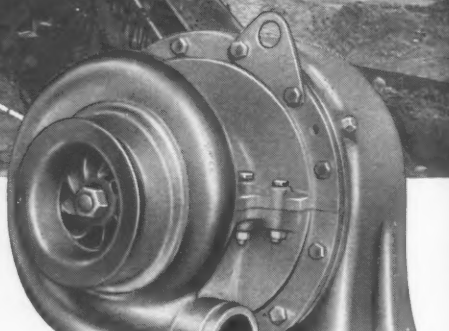
AISC — American Institute of Steel Construction, Inc. — Founded 1921

STEEL PLATE FABRICATORS ASSOCIATION — Founded 1933

THE INGALLS IRON WORKS COMPANY
Established 1910
BIRMINGHAM, ALABAMA
Plants: Birmingham, Ala., Verona, Pa., North Birmingham, Ala., Decatur, Ala., Pascagoula, Miss.

AIRESEARCH TURBOCHARGERS BOOST INTERNATIONAL HARVESTER DIESEL POWER RATINGS

AIRESEARCH TURBOCHARGED *International Harvester UDT 1091 diesel is used to power this rock crushing equipment 5000 feet high at Pueblo, Colorado. Rock crushed is from 10 inches maximum to one inch minus with a 40% crush. The AiResearch turbocharger has increased the rock crusher's production by 20%, and not only boosted horsepower 20 — 30% over the diesel's previous output at that level but actually raised it over its sea-level rating. Approximately 1800 tons of rock are being crushed in eight hours by the turbocharged UDT 1091 compared with 1400 tons in an equal period with a non-turbocharged unit. The AiResearch turbocharged UDT 1091 prevents stalling under heavy loads and has operated for over 2500 hours at elevations in excess of 5000 feet with no "down time."*



AIRESEARCH C-60 TURBOCHARGER NOW AVAILABLE ON INTERNATIONAL HARVESTER UDT 1091 DIESEL ENGINE

Installation maintains sea-level output up to 12,000 feet with an important decrease in fuel consumption

AiResearch turbochargers have an outstanding record of operation in the field. Features include turbine wheels of unmatched efficiency, air-cooling which eliminates the need for complicated plumbing and ease of installation and maintenance. Thermal loading on the engine is lower by comparison than any other turbocharging or supercharging installation. Your inquiries are invited.

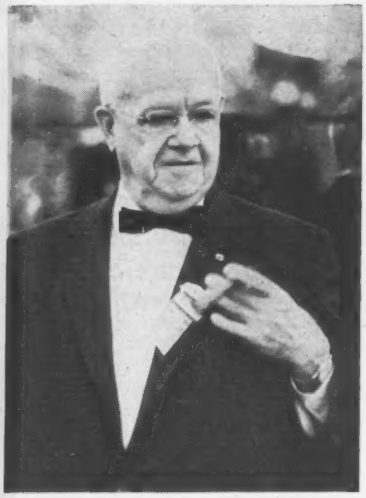
BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS					
MODEL	F-51	C-60	A-60	E-100	B-100
Diameter — in. nom.	10	11.5	15.25	15.1	15.4
Length — in.	10.5	12.9	16.75	14.7	17.1
Weight — lb.	40	95	125	112	135
Output — lb/min. (Standard Conditions)	29-51	30-60	38-60	50-100	60-100

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



PRESIDENT GRAY puts industrial union conflict on special convention floor, where . . .

TEAMSTER LEADER James Hoffa (left) had little choice but to concur in a "wait and see" recommendation presented by plumbers' President Peter Schoemann (right) . . .

Craft Unions Mark Time on Jurisdiction

With considerable finesse, the AFL-CIO building trades last week reaffirmed their faith in labor unity but politely told the AFL-CIO the price of a united labor movement is now too high.

Meeting in Atlantic City, N. J., in a special convention called for adoption of a new constitution, the Building and Construction Trades Department, AFL-CIO, served notice it will never compromise or submit to arbitration the traditional jurisdictional claims of its 19 national and international affiliates, and gave the AFL-CIO another opportunity to solve the new federation's most ticklish problem. In doing so, it denied James Hoffa, controversial teamster leader, a chance to become its spokesman in the long and bitter feud with industrial unions.

The building trades, in effect, have told the AFL-CIO they will be satisfied with nothing less than a peace formula recognizing the proposition that all construction work, whether new construction, additions to existing facilities, alterations or repairs, belongs to building tradesmen and not to industrial union members. The only area in which they are willing to concede a reasonable difference of opinion is that of running and protective maintenance work, jurisdiction over which should be determined by past practice.

As a result of the convention action taken under the firm but conciliatory leadership of President Richard Gray and plumbers' President Peter Schoemann, AFL-CIO President Meany has agreed to resubmit the explosive issue to the federation's Executive Council, which meets in Chicago this week.

• **Jurisdiction**—Key to the convention action is a July letter from Mr. Meany to the Building Trades and Industrial Union Departments outlining a settlement plan on which he said the special jurisdictional committee of the AFL-CIO Executive Council had reached "general agreement." That plan proposes use of three two-man teams for "adjusting disputes" as they arise, leading ultimately, perhaps, to some form of "definite terminal arbitration."

Building trades' members of that committee are Mr. Schoemann, Maurice Hutcheson (carpenters), Harry Bates (bricklayers), John Lyons (iron workers) and Joseph Keenan (electrical workers).

In his letter, Mr. Meany said "new building construction" is definitely work of the building trades and "running maintenance" that of industrial unions. Between these two "clear areas", he wrote, lies a doubtful or grey area "involving such work as alterations, major repairs and relocation of existing facilities, changeovers, and other types of maintenance work" as to which the two-man teams should be guided by past practice.

Speaking for building trades members of the committee, Mr. Schoemann, in what he called a "progress report" indicated that the wording of the letter is not an accurate reflection of the committee's agreement on or understanding of the plan. "Our members on that committee," he said, "recognize that construction work, whether new or additions to or general remodeling or additions to existing buildings, is work of the building trades and we have never conceded that we will ever give up our jurisdictions as granted by the charters of the AFL and AFL-CIO."

On Mr. Schoemann's assurance that Mr. Meany had agreed to reconvene the committee in an effort to clarify the proposed plan, the convention delegates decided to withold acceptance or rejection of the plan until after the outcome of that attempt. In response to a question from Mr. Hoffa, however, Mr. Schoemann indicated that the building trades will not permit the plan to become effective unless the clarification incorporates the demands of the building trades.

Convention emphasis on the hope of solving the problem without wrecking the AFL-CIO merger was highlighted by a plea for acceptance of the Schoemann report by L. M. Raftery, general president of the painters union. He said he concurred in what Mr. Gray called the "wait and see" approach even though his union, with 75% of its members employed on maintenance work,

had the most at stake. Even Mr. Hoffa admitted it was a reasonable approach.

• **Constitution**—Before disposing of the industrial union dispute, the convention unanimously adopted a new constitution. More simple and democratic than its predecessor, however, it contains a number of provisions obviously drawn with care that also reflect the "wait and see" attitude with respect not only to jurisdiction but also to autonomy, which may become a crucial issue if the AFL-CIO attempts to enforce its Ethical Practices Codes with an iron hand.

Only objection to the proposed constitution came from the lathers union, which is still dissatisfied with the Joint Board's handling of craft disputes over work assignments. Union president Lloyd Mashburn asked for an amendment specifically prohibiting the Joint Board from rendering decisions contrary to precedent and chartered jurisdiction. The request was dropped on the assurance of the Committee on Law that the Joint Board has no authority to issue decisions not in conformity with the "Green Book" (a compilation of agreements and decisions of record) and the board's procedural rules and regulations. The lathers claim they are already hamstrung by some 240 off-base decisions.

Ostensibly the most significant constitutional changes are those increasing the number of departmental vice presidents (which automatically enlarges the Executive Council) and changing the relative voting strength of affiliates to assure greater democracy in department affairs. But scattered through the document are a number of other significant changes, among them these:

• All local councils and local unions are required to include in their labor contracts with all employers who are parties to the Joint Board agreement a standard clause requiring compliance with the Joint Board procedure for settling jurisdictional disputes.

• All local unions are prohibited from setting up picket lines for jurisdictional purposes.

• The old definition of building trades' jurisdiction—"erection, repair, alteration, or demolition"—has been dropped. Instead, building tradesmen are now less specifically defined as those "primarily and customarily, or historically, engaged or operating in the building and construction trades industry and all branches, divisions and subdivisions thereof."

• The old constitution prohibited departmental recognition to unions "expelled or suspended" by the AFL. There is no counterpart with respect to the AFL-CIO.

• The president is empowered to suspend any local or state council if he deems it necessary to the welfare of building tradesmen, the department or the labor movement.

• The executive office of the department was formerly required to be in the AFL headquarters building. It's now required to be in the AFL-CIO building only if possible."

Carpenters, Plumbers End Idaho, Delaware Strikes

Strikes by Idaho carpenters and Delaware plumbers over wage demands ended last week in new two-year contracts that grant package wage boosts of 40 cents an hour or more.

The Idaho carpenters, who had been on strike for two weeks, settled with the Southeast Idaho Contractors Association for an immediate increase of 22½ cents, plus another 12½ cents next June 1. No welfare fund contributions are included, but the contract provides for travel allowances. Association members are largely small employers and homebuilders.

But 1,200 carpenters still held out in negotiations with the Associated General Contractors in Boise for increases estimated to total $1.07 an hour. AGC manager John Molitor accused the carpenters of trying to "encircle" the AGC by signing with small contractors and termed the demands "ridiculous." In addition to the basic rate increases won from the Southeast Idaho Contractors, the union is asking for 10 cents in welfare and $5.00 a day for travel outside a 30 mi radius.

Meanwhile, 550 plumbers and pipefitters in Delaware went back to work after a seven-week strike. Their new two-year contract grants a three-step increase totaling 40 cents an hour in wages and 10 cents an hour for a pension fund.

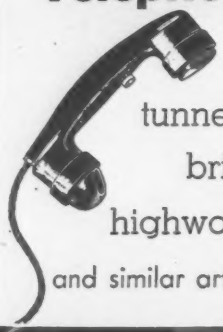
Prevailing Wage Measure Repealed by City Council

A controversial prevailing wage ordinance adopted in Des Moines earlier this year was repealed by the City Council last month.

The ordinance required a contractor on any municipal work costing more than $500 to pay construction workers at least the minimum wages established by the U. S. Department of Labor as prevailing in the Des Moines area.

Repeal of the legislation came after the city found itself unable to secure a single bid on 13 sewer and street improvement projects because of contractor objection to the ordinance.

Sound Powered Telephones



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Help to keep traffic rolling . . . to ease tie-ups . . . to report changing conditions.

NEED NO CURRENT

Theses phones provide positive communication at all times without the use of batteries or other outside sources of current. Operate with unusual clarity over a distance of many miles. In outdoor or indoor models—in standard systems or those altered to your specifications.

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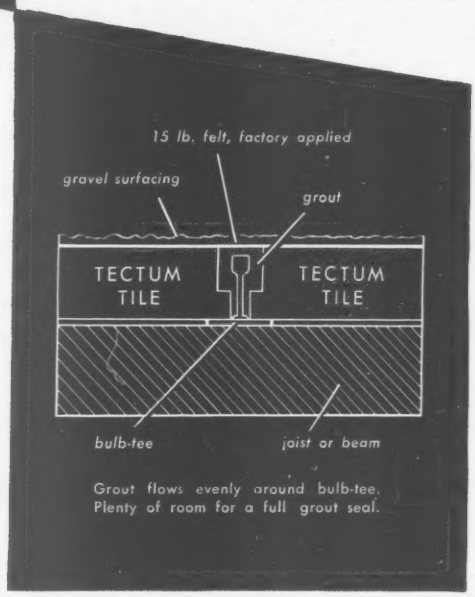
Tectum DECKS OFFER MORE

Rabbeted Edges Assure Full Grout Seal—Eliminate Metal Fasteners and Bulb-Tee Condensation—Minimize Human Error

Tectum tile with rabbeted edges on the long dimension

Tectum roof tile with rabbeted edges are designed for laying on bulb-tee sub-purlins. Grout poured around the bulb-tee cements the tiles in place and mechanical clips or special fasteners are completely eliminated. Here are the advantages: Tectum's rabbeted edges allow plenty of space for a full grout seal and grout flows evenly around the bulb-tee. Grouting eliminates metal fasteners and possible condensation problems at the bulb-tee. Your men can't make a mistake. Just fill the opening with grout and drag it smooth. 15 lb. felt, factory applied on the Tectum provides a perfect base for built-up roofing. When the Tectum's down you're ready to go—and Tectum *goes down fast.*

Write today for complete information on Tectum—the finest roof deck material you can specify. See Tectum's new strip film "The Race Against Time"—the story of five new schools with an open construction concept and Tectum deck throughout.



Grout flows evenly around bulb-tee. Plenty of room for a full grout seal.

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OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.10 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record, P.O. Box 12, New York 36, N. Y.

Bids: September 11, 1957.

For the Construction of a Raw Water Intake, Raw Water Tunnel and Low Lift Caisson

for the

BOARD OF COUNTY ROAD COMMISSIONERS OF THE COUNTY OF WAYNE, MICHIGAN

SEALED PROPOSALS will be received by the undersigned at the office of the Board, 7th floor, City-County Building, 400 Woodward Avenue, Detroit 26, Michigan, until 2 P.M. Eastern Standard Time, September 11, 1957, at which time and place all bids will be publicly opened and read aloud, for the construction of:

Item 1. A Water Intake Structure in the Detroit River with a shaft and approximately 200 linear feet of tunnel. The tunnel will be concrete lined with an internal diameter of 12 feet and will be constructed in rock below the Detroit River. This work is designated as Section "A" in the contract plans and specifications.

Item 2. A Tunnel in rock below the Detroit River, approximately 5,260 feet in length, and a shore shaft. The tunnel will be concrete lined and will have an internal diameter of 12 feet. This work is designated as Section "B" in the contract plans and specifications.

Item 3. A Land Tunnel, approximately 15,745 feet in length under Riverbank Avenue and Riverbank Avenue extended, from the Detroit River to the plant site at Moran Avenue and Vine Avenue in Allen Park, Michigan. The tunnel, to be shield driven, will be concrete lined with an internal diameter of 12 feet. This work is designated as Section "C" in the contract plans and specifications.

Item 4. An Open Caisson on the plant site. The caisson, circular in plan, will be constructed of reinforced concrete, 65 feet in internal diameter with walls 5 feet thick, and sunk to a depth, approximate, of 71 feet below existing grade. This work is designated as "Low Lift Caisson" in the contract plans and specifications.

Bids will be received for Item 1, and Item 2, individually, or for the combination thereof; for Items 3 and 4 combined; or for Items 1-2-3 and 4 combined, all as provided in the Proposal Forms.

Plans, Specifications and Information for Bidders, and the Proposal, Contract and Bond forms are on file and may be seen at the office of the Board or at the office of Parsons, Brinckerhoff, Hall and MacDonald, Engineers, 51 Broadway, New York 6, N. Y. Copies may be obtained at the office of the Board or at the office of Parsons, Brinckerhoff, Hall and MacDonald upon deposit of twenty-five dollars for each set of printed documents and reduced drawings, which deposit will be refunded if the documents are used in a bonafide bid or if returned in good condition within 15 days after the time set for opening bids. Full sized drawings may be obtained at the cost of blueprinting.

Each proposal shall be accompanied by a bid guarantee, made payable to the Board of Wayne County Road Commissioners, consisting of:

1. Either a certified or cashier's check in an amount equal to 5% of the total bid.

2. Or a certified or cashier's check in an amount equal to 5% of the first $3,000,000 of the total amount bid plus a Proposal Bond, executed by the bidder and a Corporate Surety licensed to do business in the State of Michigan, in an amount not less than 20% of the excess over $3,000,000 bid.

Proposals which have been submitted shall not be withdrawn after the time set for the opening of bids.

The Board reserves the right to reject any or all bids, and to waive any informalities in bids.

BOARD OF COUNTY ROAD COMMISSIONERS OF THE COUNTY OF WAYNE, MICHIGAN
William H. Kreger, Chairman
Charles L. Wilson, Vice-Chairman
Michael J. O'Brien, Commissioner

Bids: August 27, 1957.

New Jersey Turnpike Authority

CONTRACT NO. R-7 (R-7A, R-7B)

Proposals are invited for Contracts Nos. R-7, R-7A and R-7B, which involve the repainting of the superstructure steelwork on the Hackensack River Bridge (Contract No. R-7A) near Laurel Hill in Hudson County, and the Passaic River Bridge (Contract No. R-7B) near the City of Newark in Essex and Hudson Counties, which bridges form parts of the New Jersey Turnpike. Contract No. R-7 comprises all the work required under Contracts Nos. R-7A and R-7B.

Repainting shall consist of the application of one (1) finish coat of paint to the surfaces of all steel work in addition to initial cleaning and spot-painting in areas where the original coat or coats of paint are not in satisfactory condition.

The approximate tonnage of superstructure steelwork to be repainted on the Hackensack River Bridge is 15,850 tons. The approximate tonnage of superstructure steelwork to be repainted on the Passaic River Bridge is 21,000 tons.

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 o'clock Eastern Daylight Saving Time, on the morning of August 27, 1957, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement.

Contract documents may be examined during office hours on or after August 7, 1957, at the office of the Authority and at the office of the Consulting Engineers, Howard, Needles, Tammen & Bergendoff, 99 Church Street, New York 7, New York. Contract documents will be furnished upon payment of Five Dollars ($5.00) for each set, upon application to the Authority. Contract documents are not required to be returned and the payment will not be refunded.

NEW JERSEY TURNPIKE AUTHORITY
Joseph Morecraft, Jr., Chairman

August 5, 1957.

Bids: August 29, 1957

Contract O & M-445

THE PORT OF NEW YORK AUTHORITY
U. S. NAVAL INDUSTRIAL RESEARCH SHIPYARD AT PORT NEWARK
STEAM SERVICE TO BLDG. NO. 4

Sealed proposals for furnishing all labor, material and equipment for installation of steam and condensate piping from Building No. 9 to Building No. 4 and the rehabilitation of plumbing and heating fixtures in Building No. 4 in the U. S. Naval Industrial Reserve Shipyard at Port Newark will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11:00 A.M., Thursday, August 29, 1957, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, and you will be furnished with the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, August 15, 1957

Bids: August 29, 1957

Contract O & M-444

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
RESURFACING PAVEMENT

Sealed proposals for furnishing all labor, material and equipment for resurfacing pavement at New York International Airport will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, New York, until 11 A.M., Thursday, August 29, 1957, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, and you will be furnished with the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, August 15, 1957.

Bids: August 27, 1957

Contract GWB-802.246

THE PORT OF NEW YORK AUTHORITY
GEORGE WASHINGTON BRIDGE
SECOND DECK
NEW YORK APPROACH
BORINGS

Sealed proposals for making borings for additional approaches for the George Washington Bridge will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, August 27, 1957 at which time said proposals will be opened and read in Room 1108.

Contract Documents may be seen at the office of the Engineer of Design of the Authority, Room 1115, and copies will be furnished upon request. No deposit will be required but the documents shall be returned in good condition not later than forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, August 15, 1957

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4947) will be received at Camp White, Oregon until September 10, 1957, for furnishing labor and materials for earthwork, concrete canal lining, and structures for Howard Prairie Delivery Canal and Little Beaver Creek Canal, Rogue River Basin Project, Oregon. Location east of Ashland, Oregon. Principal items are 144,000 cu. yds, excavation; 7,350 cu. yds. concrete in structures and lining; 11,000 lin. ft. sewer pipe drains, 6- and 8-inch; 1,371 lin. ft. concrete pipe siphon, 48-inch; and other work. Completion time 540 days. For particulars, address Bureau of Reclamation, P. O. Box 386, Camp White, Oregon; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: August 29, 1957

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A.M., eastern standard time, on the 29th day of August, 1957, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1; G. L. Nickerson, District Engineer, 353 Broadway, Albany, N. Y.						
Albany (Rte. 43)	R.C. 57-142	Normanskill Viaduct, S.H. 9109	0.22	Reconstruction of Viaduct Abutments, Pier, Sidewalks, Curbs and Expansion Joints	$2,500 Plans $10	$45,000
Albany (Rte. 7)	FARC 57-144 FAC 57-9	Troy–Schenectady, Pt. 4, S.H. 630 City of Watervliet: 19th Street (City Line to Grotto Ct.) Project U-411(4)	2.39	Asphalt Concrete Pavement 2 @ 24′ Var. Wide	80,000 Plans $15	1,225,000
Albany & Saratoga	FISH 57-16	Interstate Route 502 (Mohawk River Bridge & Approaches) (Latham to Clifton Park, Sect. 2, Cont. 2) Project I-1119(7)	0.27 (0.43 Acc.)	9″ Cem. Conc. Pavt. 2 @ 36′ Wide = 0.27 Mi. Asphalt Conc. = 0.43 Mi. 600′ Span Hinged Steel Arch Bridge With Comp. I-Beams Approaches 213.5′	300,000 Plans $25	5,598,000
Saratoga & Washington (Rte. 29)	FARC 57-141	Schuylerville Village: North Broad and Ferry Streets, S.H. 1591 Schuylerville–Greenwich, S.H. 1437 Project F-1135 (1)	0.61	9″ Cem. Conc. Pavt. Var. Wide = 0.59 Mi. Misc. Work = 0.02 Mi. Comp. I-Beam Br. 348′ Cant. Girder & Comp. I-Beam Br. 531′	78,000 Plans $15	1,429,000
DISTRICT No. 2, Lacy Ketchum, District Engineer, 109 No. Genesee St., Utica, N. Y.						
FULTON (Rte. 29)	FASS 57-11	Union Mills-South (Co. Rd.) Project S-502(1)	2.26	Graded Gravel, Bit. Double Surf. Treat.	16,000 Plans $15	293,000
Fulton (Rte. 10)	FARC 57-146	Ephratah-Kecks Center, Pt. 2, Project S-472(1) S.H. 620	0.28	Asphalt Concrete Comp. I-Beam Br. 37′	7,000 Plans $10	129,000
DISTRICT No. 3, William Robinson, District Engineer, 333 E. Washington St., Syracuse, N. Y.						
Onondaga & Oswego (Rte. 11)	FARC 57-150	Cicero–Brewerton, S.H. 5249 Central Square–Union Square, S.H. 5415 Project F-463(12)	10.39	Grading, Drainage and Tree Planting	$14,000 Plans $10	$255,000
Cayuga (Rte. 38A)	FARC 57-152 R.C. 57-158	Auburn–Owasco, S.H. 614 Project F-642(2)	6.05	Asphalt Concrete, Type 1A	8,000 Plans $10	142,000
Seneca (Rte. 89	FARC 57-143 R.C. 57-149	East Varick-Canoga, S.H. 8386 Canoga-Halsey Corners, S.H. 8363 Project F-509(4)	12.53	Asphalt Concrete	32,000 Plans $10	596,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester, N. Y.						
Monroe (Rte. 64)	R.C. 57-151	Pittsford Village: Monroe and South Main Streets, S.H. 5435	....	Cleaning and Painting 1 Bridge	800 Plans $10	15,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, 65 Court St., Buffalo, N. Y.						
Chautauqua (Rte. 60)	FARC 57-106	Sinclairville-Casadaga, Pt. 2, S.H. 1012–1012A Casadaga–Fredonia, S.H. 938 Project F-1117(1)	6.27 (1.83 Acc.)	Asphalt Conc., 6.49 Mi. 9″ Cem. Conc. Pavt. 24′ Wide = 1.24 Mi. Misc. Work = 0.37 Mi. Reinf. Conc. Arch Br. 68′	140,000 Plans $25	2,506,000
DISTRICT No. 8, K. G. Rauer, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Rockland	H.T. 57-3	New York State Thruway–Hudson Section-Sub. 8 Access Ramp to Route 59	0.26	9″ Cem. Conc. Pavt. Var. Wide	4,000 Plans $10	69,000
DISTRICT No. 9, J. C. Frederick, District Engineer, 71 Frederick St., Binghamton, N. Y.						
Broome & Schoharie	R.C. 57-148	Barker, S.H. 375 Howes Cave-Cobleskill, S.H. 5286	....	Cleaning & Painting 2 Thru Truss Bridges 160′ and 145′	$500 Plans $10	9,000
Sullivan	FESS 57-6	Barryville–Yulan, Co. Rd. 21 Project ER-26(2)	1.86	Asphalt Conc., Opt.	13,000 Plans $15	247,000
DISTRICT No. 10, M. E. Goul, District Engineer, Little East Neck Road, Babylon, L. I., N. Y.						
Nassau (Rte. 107)	FARC 57-147	Massapequa–Glen Cove, S.H. 9017 Project U-S-377(1)	2.47 (1.29 Acc.)	9″ Cem. Conc. Pavt. 2 @ 37′ Var. Wide = 2.27 Mi. Asph. Conc., = 0.46 Mi. Temp. Asph. Conc. = 0.39 Mi. Misc. Work = 0.64 Mi. Bridge Widening at Northern State Parkway	125,000 Plans $50	2,273,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds.

Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON

SUPT. OF PUBLIC WORKS

APPROACHES, SUBSTRUCTURE AND MISCELLANEOUS CONSTRUCTION FOR DOUBLE DECK VERTICAL LIFT BRIDGE CARRYING HIGHWAYS M-26 AND US-41 RELOCATED; THE COPPER RANGE RAILROAD, AND DULUTH SOUTH SHORE AND ATLANTIC RAILROAD OVER PORTAGE LAKE BETWEEN HOUGHTON AND HANCOCK, IN HOUGHTON COUNTY

PROJECT: U B1 of 31-10-1 C5 U, U 175 (22)

Net classification required for this project is 400 Fa, Sub E, Sub B, Sub Cc, Sub P, Sub Railway Signal Work, Sub Tower Manlifts, Preplaced Aggregate Concrete (if elected). Approval of Bidder is required by the Chief Engineers of the Copper Range Railroad, and the Duluth South Shore and Atlantic Railroad.

Sealed proposals for the construction of this project will be received from contractors having 1957 Michigan State Highway Department prequalifications, in Room 701 Stevens T. Mason Building, Lansing, Michigan, until 10:30 A.M. Eastern Standard Time on Wednesday, September 25, 1957 and will then and there be publicly opened and read. Proposals may be mailed to the Contract-Estimate Office, 715 Stevens T. Mason Bldg., Lansing, Michigan.

The work will consist of construction of approaches, substructure, electrical, railway signals, etc. Prequalification reporting forms may be obtained on application to the Contract-Estimate Engineers Office. Prequalification must be cleared 10 days prior to the letting date.

Completion date for entire project December 15, 1959.

The Department's Standard Specifications (Current Edition), its current Soils Manual, the plans for this project, the special provisions governing subletting and assigning the contract and the employment and use of labor, and the proposal blanks (all of which are essential parts of the contract) may be examined at the district office of the Department at Crystal Falls & Lansing and at the Michigan Road Builders Association, Lansing, Michigan, but may be obtained only at the office of the Contract-Estimate Engineer, 715 Stevens T. Mason Bldg., Lansing, Michigan, up to 5:00 P.M. of the day preceding the opening of bids. A fee of three dollars will be charged for furnishing plans or proposal blanks, which will not be refunded.

Full cooperation in carrying out the special provisions will be required. Minimum wage paid to labor employed on this contract shall be as outlined in the proposal.

A Certified or Cashier's Check, Bank Money Order, or Certificate of Deposit, properly endorsed, on an open, solvent bank, in the sum of $200,000.00 payable to John C. Mackie, State Highway Commissioner, must accompany each proposal. All such checks will be returned promptly after the bidding, except that of the lowest bidder will not be returned until execution and delivery of the contract to the State Highway Department.

The right is reserved to reject any or all proposals.

JOHN C. MACKIE

State Highway Commissioner

OFFICIAL PROPOSALS

Bids: September 4, 1957.

Power Authority of the State of New York

Advertisement for Proposals for the Construction of Foundations for Barnhart-Adirondack Transmission Line—North Extension Near Massena St. Lawrence County, New York

SPECIFICATIONS NO. PA-8-103
CONTRACT NO. T8

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of foundations for Barnhart-Adirondack transmission line—north extension, near Massena, St. Lawrence County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 4th day of September, 1957, at the Authority's office, 18th Floor, the Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The estimated quantities of work are:

Clearing	43 acres
Excavation and backfill, unclassified	52,000 cu. yds.
Furnishing and driving steel piles	10,500 lin. ft.
Concrete	2,000 cu. yds.
Reinforcement bars	360,000 pounds

All work shall be completed on or before December 31, 1957.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, at 18th Floor, the Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents, and Five ($5.00) dollars per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and The Hydro-Electric Power Commission of Ontario, 620 University Ave., Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: September 3, 1957.

Power Authority of the State of New York

Advertisement for Proposals for the Construction of the 115 KV Transmission Lines for Reynolds Power Supply

SPECIFICATION PA-8-20
CONTRACT NO. T7

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the complete installation of the 115 kv transmission lines for the Reynolds Power Supply until 10:30 A.M. Eastern Daylight Saving Time on the 3rd day of September, 1957, at the Authority's office, 18th floor, the Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are estimated:

60 wood pole structures of various types—poles, crossarms, and braces furnished by the Authority.

1,100,000 pounds steel tower structures—structural steel and accessories furnished by the Authority.

10 miles of stringing cable—cable furnished by the Authority.

The length of the project is 4 miles.

The work shall be completed on or before September 1, 1958.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, may be inspected by prospective bidders during office hours, and may be obtained from the Power Authority of the State of New York, the Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten ($10.00) dollars for initial set and Five ($5.00) dollars for each additional set, no part of which will be refunded.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

U. S. Government

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, until 10:00 A.M., October 23, 1957, and at that time publicly opened, for the work and material required to convert Gatun, Pedro Miguel and Miraflores Locks in the Panama Canal Zone from 25 cycle to 60 cycle operation. Plans and specifications are available for examination in the office of Chief, Procurement Division, Panama Canal Company, 21 West Street, New York 6, New York. Data can be obtained upon payment of $50.00 deposit which will be refunded when data is returned within 40 calendar days after bid opening. For further information contact this office, Desk No. 1, or telephone Bowling Green 9-5380, extension 56.

DEPARTMENT OF HIGHWAYS, MONTPELIER, VERMONT. NOTICE TO CONTRACTORS. Sealed proposals will be received by the department at the State Office Building until 11:00 o'clock A.M. Eastern Daylight Saving Time (10:00 o'clock A.M. Eastern Standard Time) on Friday, August 23, 1957, for the construction of the following project: GUILFORD-BRATTLEBORO I 001-1 (6): In the Towns of Guilford-Brattleboro; the Bernardston, Massachusetts-Brattleboro, Vermont road; beginning approximately 5.879 miles northerly of the Massachusetts-Vermont State Line and extending northerly 1.942 miles. Type of construction being grading, drainage, sub-base with a bituminous concrete surface course; two 3-span steel I-beam structures with a concrete floor and two 2-span steel I-beam structures with a concrete floor. Complete information at said office; plans on display at the office of R. O. Munn, District Highway Engineer; Brattleboro, Vermont; minimum wage rates predetermined by the Secretary of Labor for the project are set out in the advertised specifications and bid proposal, and such rates are a part of the contract covering the project. Minimum truck rates have been predetermined by the State Highway Board and are set out in the bid proposal. Contractors bidding on construction involving over $25,000.00 must be prequalified in accordance with Department Regulations. Right is reserved to reject any or all bids and waive any or all technicalities. William Poeter, Commissioner of Highways. Montpelier, Vermont. July 25, 1957.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4951) will be received at Albuquerque, New Mexico until September 17, 1957, for furnishing labor and materials for channelization of the Rio Grande, Socorro area, Middle Rio Grande Project, New Mexico. Location north of Socorro, New Mexico. Principal items are 1,677,000 cu. yds. excavation; lump sums, cleaning existing drains; 1,200 lin. ft. corrugated-metal pipe and pipe arches; 104 M.b.m. timber bridge; 4,200 units metal jetty units; and other work. Completion time 450 days. For particulars, address Bureau of Reclamation, P. O. Box 252, Albuquerque, New Mexico; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-4952) will be received at Denver, Colorado, until October 8, 1957, for furnishing 3,000,000 barrels of Portland Cement for Glen Canyon Dam and Powerplant, Colorado River Storage Project, Arizona-Utah. All cement required to June 30, 1964. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

GOVT. OF DIST. OF COL., DEPT. OF SAN'Y. ENG'G., Aug. 1, 1957. SEALED PROPOSALS will be recd. in Rm. 404, 499 Pa. Ave., N. W., Wash. 1, D. C., until 2 PM, EDT, Sept. 12, 1957, and then publicly opened and read for constr. of 25 M.G. LOW SERVICE RESERVOIR in Brentwood Park vic. New York Ave. & 9th St., N.E., consist. of 25 million gal. capacity Low Reservoir Service. Proposal forms, plans and specns. obtainable from Supervisor, Contr. & Bond Section, Procurement Office, D. C., Rm. 406, 499 Penn. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to Collector of Taxes, D. C. (Tel. NA 8-6000, Ext. 2378).

EMPLOYMENT OPPORTUNITIES

DISPLAYED —RATES— **UNDISPLAYED**

The advertising rate is $31.80 per inch for all advertising appearing on other than a contract basis.
An Advertising Inch is measured ⅞" vertically on a column—3 columns 30 inches to a page.
Subject to Agency Commission.

$2.10 per line, minimum 3 lines.
Position Wanted ½ of above rate.
Box Numbers—counts as 1 line.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.
Not subject to Agency Commission.

Send NEW ADS to ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36, N. Y.

ARCHITECTURAL ENGINEER

Architectural Engineer between ages of 25 and 35 with interest in design of industrial buildings and structures.

Excellent opportunity with consulting engineering firm in Middle West. Liberal benefit plans and good working conditions.

Send resume of education and experience with statement of salary requirements to:

P-3222, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

Wanted for South American Project

EXPERIENCED CONCRETE SUPERVISOR

To head inspection group on a very specialized type of operation. Must be thoroughly familiar with concrete mixes, aggregate and cement testing, etc. Man must be able to coordinate inspection and quality control with maximum of efficiency. Graduate engineer desired. Limited accommodations for family—reply stating experience, availability, and salary requirements to

P-5820—Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Construction Superintendent Wanted

Superintendent for Engineering type construction such as pumping stations, sewage and water treatment plants and flood control work. Steady employment for aggressive qualified man. Prefer man with engineering background. Send complete details on background and education. Only those well qualified need apply. Must be willing to move around southern states at job completion.

P-5505, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

ASSISTANT TO PRESIDENT

General contractor doing one story industrial building ranging from 5,000 to 60,000 sq. ft. Minimum 10 years construction experience. Engineering background desired. Ability to handle job from estimates to occupancy. Age 30 to 45. Send resume. Reply:

P. O. Box 185
MONTCLAIR, N. J.

ENGINEERS

Long established firm of consulting engineers with world-wide practice needs both beginners and experienced civil, electrical, mechanical and foundation engineers for interesting work on large dams, powerplants, and river control works. Permanent positions. Liberal employee benefits. Starting salaries dependent on qualifications. Please send complete resume to Hugo Niemi, Personnel Manager.

HARZA ENGINEERING CO.
400 W. Madison St. Chicago 6, Ill.

HIGHWAY & BRIDGE ENGINEERS

Well established Consulting Engineer has immediate openings for engineers experienced in Highway and Bridge design and construction. Permanent positions. Liberal Employee benefits. Salaries commensurate with education and experience. Send complete resume including salary requirements and availability.

WILLIAM H. McFARLAND
ENGINEER
333 Front Street Binghamton, New York

Engineers and Draftsmen

Continue your careers in Ventura County, a smogfree coastal section of Southern California where there are unlimited opportunities, good salaries, fringe benefits, living conditions, chances for advancement. We can employ:

Asst. Civil Engineers in Design, at a minimum salary of $572 per month.

Junior Civil Engineers in Design at a minimum salary of $495 per month.

Experienced Draftsmen at a minimum salary of $448 per month.

Send a brief resume of your education and experience qualifications to: Personnel Dept., Court House, Ventura, Calif.

ENGINEERS

Civil Structural Hydraulic

Highways, Flood Control and Navigation, Industrial and Institutional Buildings, Sewage Treatment and Water Works. Design and Reports.

Other excellent opportunities in Mechanical and Electrical Engineering with Consulting Firm. Location Middle West.

Send resume of education and experience with salary requirements to:

P-5582, Engineering News-Record,
520 N. Michigan Ave., Chicago 11, Ill.

LABORATORY ENGINEER
(LAB & FIELD)

Asphalt, Concrete & Soils.
Air Base AE experience.
Degree or equivalent.

Send complete resume including past experience & salary required.

P-5809—Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

FLORIDA'S STATE ROAD DEPARTMENT
NEEDS
Highway and Bridge Designers

Well paying positions open to qualified men and women in every area of the nation's most popular vacation state.

REQUIREMENTS

All applicants must have a BS Degree in Civil Engineering or equivalent combination of training and experience.

Classifications	Monthly Salary Range Min. Max.
Degree with no experience (Trainee III)	$440-$525
Two years experience (CE I)	460- 525
Three years experience (CE II)	525- 600
Four years experience (CE III)	600- 760

(Applicants for CE III must be registered professional engineers and must obtain Florida registration within 18 months after appointment.)

Job security and advancement assured under State Merit System.

Paid sick and annual leave, hospitalization and retirement programs.

Qualified older workers are welcome.

If you want to live and work in Florida and are qualified, send resume of education and experience immediately to:

DIRECTOR OF PERSONNEL
STATE ROAD DEPARTMENT OF FLORIDA
TALLAHASSEE, FLORIDA

Highway & Bridge Engineers Designers & Draftsmen

Career opportunities for men interested in professional recognition.
Excellent working conditions and employee benefits including liberal retirement program.
Openings in Pennsylvania, Maryland, Mississippi, Ohio & West Virginia.

Air Mail Resume to R. L. SHAW, *Personnel Director*

MICHAEL BAKER, Jr., INC.
BAKER BLDG. *Consulting Engineers* ROCHESTER, PA.

RESIDENT ENGINEERS

Graduate Civil Engineers with experience in concrete and earthwork construction to serve as Resident Engineers on Dams and Flood Control projects in Pennsylvania. Design Engineers with related experience are also desired.

Salary open. Send resume showing experience, salary requirements and references to:

P-5586, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

CIVIL ENGINEERS

GRADUATE ENGINEERS WITH ONE TO FIVE YEARS EXPERIENCE FOR HIGHWAY AND BRIDGE DESIGN IN NEW ORLEANS, LOUISIANA OR IN HARRISBURG, PA.

Permanent positions with opportunity for Advancement.

Company paid life insurance and Pension Plan
Air Conditioned Offices
Liberal Salaries

MODJESKI AND MASTERS ENGINEERS
P. O. Box 167
Harrisburg, Penna.
2400 Canal Street
New Orleans 19, Louisiana

SALES ENGINEER TRAINEE

Recent civil engineer graduate or non-graduate with highway engineering or construction experience to enter sales training program. Position requires relocating at intervals during training period. Will eventually lead to highway material sales in Tar Products Division. Write stating education, experience and salary requirements. All replies will be confidential.

KOPPERS COMPANY, INC.
Personnel Manager
108 Koppers Building—Pittsburgh 19, Pa.

CONSTRUCTION SUPERVISORS

Supervisory personnel with experience in responsible supervision and inspection of concrete and earthwork construction to serve as Construction Supervisors on Dams and Flood Control projects in Pennsylvania. Engineering degree not required.

Salary open. Send resume of experience, salary requirements and references to:

P-5583, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, New York 36, N. Y.

CIVIL ENGINEER

FOUNDATIONS—BRIDGES—TUNNELS—DAMS

Unusual opportunity for a recent graduate (under 30) intending to make a career of heavy construction.

Long established, successful organization constructing multimillion dollar projects in Great Lakes and Middle Atlantic States has opening for an exceptional engineer.

Replies giving record of accomplishments and references will be acknowledged.

P-5741—Engineering News-Record
Class. Adv. Div. P.O. Box 12, N.Y. 36, N.Y.

Employment Opportunities with the City of Springfield, Missouri

CHIEF DIVISION OF GENERAL PUBLIC WORKS OPERATIONS: Graduate Civil Engineer, age 30 to 50, for responsible professional and administrative work in the operations of the Department of Public Works.

SECTION HEAD: Graduate Civil Engineer to head paving or storm sewer design section. Must be capable of performing detailed design work as well as supervise subordinate personnel engaged in such activities.

The City of Springfield also has need of Designers, Draftsmen and Construction Inspectors.

Application for any of the above jobs should be made, giving minimum salary, to Department of Personnel, City Hall, Springfield, Missouri.

AREA ENGINEER
(CIVIL—HIGHWAYS)
FOREIGN EMPLOYMENT

U. S. Consultant requires services of broadly qualified highway engineer 15-25 years experience in design, maintenance and construction to join established group of American engineers engaged on an extensive highway program in a Near East Country. Living conditions good. Liberal salary and living allowances; transportation of family plus other attractive allowances and benefits. Send detailed personal record. Applicants' confidence will be respected.

P-5779—Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

Graduate Civil Engineer

Excellent opportunities with nationally recognized organization engaged in engineering service work in highway and concrete fields. Location North Carolina and also covering southern Virginia and Georgia area. Permanent position. Salary based on qualifications and experience. Car allowance and expenses. Excellent benefits and retirement program.

P-5744—Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

ESTIMATOR
INDUSTRIAL CONSTRUCTION
NORTHERN NEW JERSEY

5 years construction experience. Engineering background desired. Salary open. Age 30 to 40. Reply:

P. O. BOX 185
MONTCLAIR. N. J.

REPLIES (Box No.): Address to office nearest you c/o This publication Classified Adv. Div.
NEW YORK: P. O. Box 12 (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Engineer-Gunite, wanted immediately, must know estimating, take complete charge of all gunite operations. Executive position ultimately available. P-5355, Engineering News-Record.

Wanted—Experienced grading and drainage superintendent for position with expanding Michigan contractor. Paving experience would also be valuable but not essential. Write, giving full particulars and salary desired: Canonie Construction Co., South Haven, Mich.

Wanted: Civil Engineering Draftsmen for work on large Southern California irrigation and drainage project. Desert type climate. Permanent position with excellent opportunity for advancement for qualified men. Salary range $3,600 to $6000 per year, dependent on experience. All applications kept confidential. Must be citizen. Please give full details of experience and education. P-5644, Engineering News-Record.

Estimators—Experienced in Industrial Construction. Permanent positions in Southeastern States. Send resume of education and experience, references and salary requirements. P-5675, Engineering News-Record.

Civil Engineers Wanted—with experience in the fields of Highway design, structures, water distribution systems, sewers, sewage treatment, pumping stations and storm drains. Public works experience desirable but not essential. Good starting salaries, excellent working conditions; stable community, fine opportunity for advancement, Merit System increases and retirement benefits. Send resume of experience and salary desired to: Department of Public Works, Baltimore County Office Building, Towson 4, Maryland.

City Engineer and Planner, small New England city. C. E. Graduate or seven (7) years experience, Municipal experience preferred but not mandatory. Please state qualifications and salary desired in first letter. Apply, Office of Mayor, Franklin, New Hampshire.

Sales Engineers—structural experience, to promote, estimate and negotiate sub-contracts gypsum and Creteplank roof decks. Opportunities in Pittsburgh-Cleveland area and Western New York area. Write R. G. Speed, Martin Fireproofing Corporation, Buffalo 17, New York.

Teaching—Increased enrollment requires new staff members AT instructors to associate professor level to teach Structures, Fluid Mechanics, Mechanics and Strength of Materials. Opportunities to participate in contract research. Also opportunity for advanced degree for instructors. Head Civil Engineering Department, University of Tennessee, Knoxville, Tennessee.

Bridge Designers and Draftsmen with experience for permanent positions. Forward full educational, employment and personal data with salary requirements. Macomber & Faber, 1824 North Fourth Street, Harrisburg, Pennsylvania.

POSITIONS VACANT

Gunite Superintendent—Wanted Immediately Middle Atlantic States. State age, experience availability, salary desired. P-4640, Engineering News-Record.

Excellent opportunity in Consulting Engineer's office for competent engineer experienced in design and inspection of water and sewage systems, water and sewage treatment plants, estimates, reports. State education, age, experience, salary required and when could report. Correspondence confidential P-5747, Engineering News-Record.

Civil Engineer—$5349-$6549. Public works and utilities engineering for progressive growing, industrial city of 70,000 population. Application and brochure of city available. Write Personnel Officer, Municipal Building, Hamilton, Ohio.

Beginning Civil Engineer—Recent graduate Mount Clemens, Michigan. Near Lake St. Clair. 20 miles Northeast of Detroit. Annual salary $5,122-$5,902. P-5509, Engineering News-Record.

Civil Engineers to work with consulting engineering firm. Long established municipal consulting firm desires to secure graduate civil engineers for permanent positions. Experience in water and sanitation required. Offices located in very desirable small college community in Colorado area. Expansion of firms operations provide unlimited opportunities for advancement for properly qualified engineers. Firm desires to employ engineers with from one to fifteen years of experience. Salaries $5,100 to $6,600. Civil engineers with masters degree in sanitary engineering or masters degree in structural design also required. Salary commensurate with experience. Please give experience and full details in reply, including transcript of post-graduate work. Replies will be held confidential if requested. P-5570, Engineering News-Record.

Civil-Structural Engineer wanted. Preferable Highway Bridge experience. Work in Tucson, Arizona. P-5772, Engineering News-Record.

Civil Engineers, Florida—Expanding consulting office on middle east coast of Florida has opening for professional grade field and office engineers experienced in municipal work including utilities. Write complete qualifications to: Alton A. Register and Associates, Engineers, 204 Professional Building, Fort Pierce, Florida.

Northern New Jersey Construction Co. has an opening in its Estimating Department. Must have previous experience in estimating sewer lines, earth moving, and road work. Send resume and salary requirements. P-5818, Engineering News-Record.

Chief Engineer (Former Chief Draftsman). Large eastern steel fabricator specializing in heavy structural steel for bridges, office building, schools, etc. Excellent opportunity for man with at least 8 years experience in the preparation of structural details for shop fabrication plus structural steel design and ability to manage design and detailing department. Salary $17,500 plus benefits. Chance for advancement. Replies confidential. P-5835, Engineering News-Record.

Construction—Asst. Mgr. for Ind. Bldrs. Bergen Co. PE. Heavy in field & estimating. State sal., busn. following. P-5853, Engineering News-Record.

EMPLOYMENT SERVICE

Better Positions—$6,000 to $50,000. Want a substantial salary increase, more opportunity or different location? This national 47 year old service connects you with best openings. You pay us only nominal fee for negotiations: This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 559 Brisbane Bldg., Buffalo 3, N. Y.

EMPLOYMENT AGENCY

Wanted Engineers, Designer, Draftsmen, All lines. Chemists, teachers and industrial engineers. Recent grads. Cleveland Engineering Agency, 2132 E. 9, Cleveland 15, O.

SELLING OPPORTUNITY OFFERED

Manufacturers Representative wanted for several good territories in the United States. Liberal Commissions Chinook Wind Portable Heaters & Torches. Write International Manufacturing Co. 675 Rio Grande, Littleton, Colorado.

Continued on page 188

ENGINEERS

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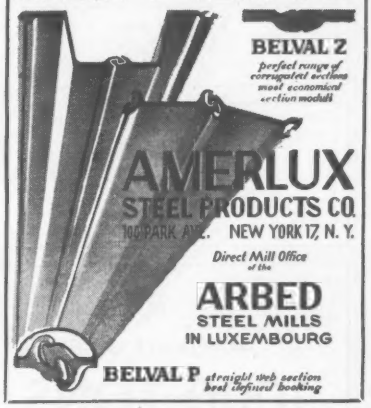

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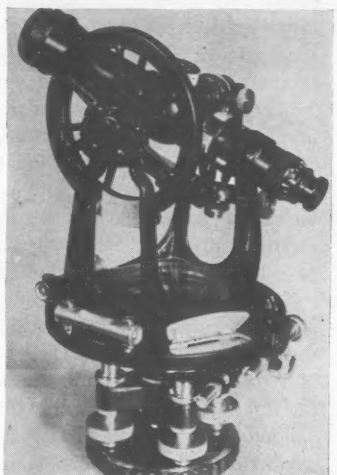

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Grants-in-Aid Are Working

SEWAGE WORKS CONSTRUCTION in the U. S. has been stimulated by a well administered program of federal aid. This first appraisal of the construction grants program is drawn in ENR this week (see p. 25) after a check at city, state and federal levels, and after careful study of the all-important contract awards figures in the sewage plant field.

The well-substantiated conclusion that federal aid is a success after one year is an important finding first and foremost because this sewerage stimulation program has nine more years to go. But perhaps it is a finding of even broader significance.

It may be that champions of federal aid for school construction could profit from study of Public Law 660, the Water Pollution Control Act. For while school aid failed to pass in this session of Congress, the sewerage construction aid found Congressional support readily a year ago. And while one objection to federal aid of any sort is the presumed loss of control to the administering Washington agency, there has been little, if any, of this evidenced by the cities or states now working with grants on pollution abatement projects.

It was not evident from the start that the program would work so well. In fact, when the notion of federal aid to cities first came up, sponsored by the American Municipal Association, it appeared in the House bill as a loosely specified federal dole completely lacking in assurances that it could stimulate new construction. It simply stated that "the Surgeon General shall make federal funds available for such treatment works, in a manner which will tend to result in a wide distribution of such funds among the several areas of the United States" —a most carelessly written provision and one which would have led to all sorts of administrative difficulties.

But in remarkably short time, the sound thinking of pollution control experts was brought to bear on and through the U. S. Public Health Service for the writing of a grants-for-construction provision that is now passing the test of application. These experts could support federal aid only with assurances that it would help the cities needing help and thereby stimulate construction that might be an unreasonable financial burden on these communities without help (ENR June 7, 1956, p. 40). And that, generally, is the kind of aid now being disbursed so effectively.

It is interesting to speculate that because it was written in such haste, the water pollution legislation came out a better law. The point is that the Federal Water Pollution Act formulated only enough details to assure that the objective of construction aid would be attained, and left many of the fine points of deciding who is to get what aid to the states. If there had been more time, we might have wound up with a Washington-spun ravel of red tape that would have stifled sewage works construction. Instead, there is a minimum of federal control, a maximum of state responsibility, and, it appears, a smoothly functioning, effective aid program.

All who are concerned with this sewerage program—the states, PHS, and the cities—are to be congratulated for the way things have started out. And as suggested above, there may be others who can profit from study of how the cooperating federal and state agencies have made it work. Last July, when it was signed into law, we said the federal aid to sewage works construction "optimistically can be presumed workable." This optimism was well founded.

Why Do It Yourself?

THERE IS SOMETHING HEARTWARMING about the way the editor of the British magazine, "Engineering," recently let fly at the "do-it-yourself" mania. It is too good and sensible not to be quoted, to the extent of available space, for the benefit of American victims.

Says the editor, "One of the absurdities of our time is the growth of 'do-it-yourself'. The benefits of the division of labor, built up over hundreds of years of industrial development, are thrown away in a craze for amateur decorating, building and repairing. . . . The crowning irony is a man working overtime in his own home—sometimes till the early hours of the morning—with the wife taking the part of a very demanding progress officer.

"It is no use saying that the do-it-yourself movement is good because it encourages men to take pleasure in making things and doing jobs for themselves. If that were the whole story the movement would be wholly acceptable. But it is not. What is happening is that a considerable amount of work is being done reluctantly by inefficient amateurs. . . . It would be better for the country and for the individual if men were to work at their own jobs for slightly longer hours, thereby earning enough money to pay professionals to carry out repair and maintenance.

"By all means let men paint walls if they like painting walls; let them hang wallpaper if they enjoy hanging wallpaper; let them make furniture if the smell of sawn lumber is a savoury smell in their nostrils; let them lay bricks, if they want to emulate Sir Winston Churchill. But let us end this confusion between true hobbies and desperate attempts to make ends meet. We shall all be better off if we do."

Discounting the fact that the editor may himself be one of the reluctant victims, and thus prejudiced, he has penned a message to ponder. Our vaunted "new leisure" will be dearly bought if it must be used to do things that someone else could do better, but which are too expensive to hire done. Do-it-yourself can become a pretty hobbling hobby.

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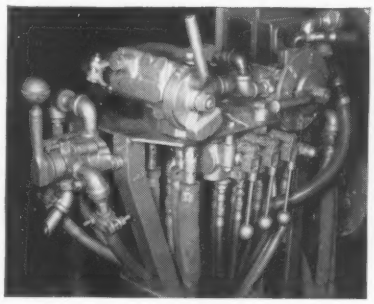

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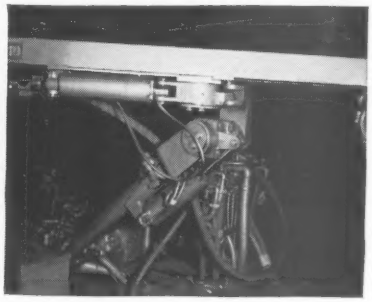

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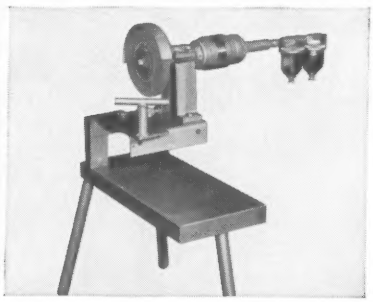

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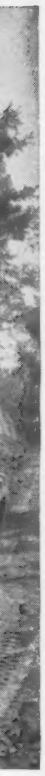

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